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MOMENTIX OCCASION: QNX REBRANDS TO CUT CONFUSION

Bundles Neutrino RTOS with GUI tools

BY EDWARD J. CORREIA

Admitting that its previous marketing strategy was confusing and inefficient, embedded systems developer QNX Software Systems Inc. has launched Momentix, a new branding strategy that includes a pair of software bundles that the company says now organize its offerings and more logically target specific developer types.

Scheduled to begin shipping June 3, the Momentix bundles will combine the company's Neutrino real-time operating system based on POSIX APIs with a set of graphical C/C++ and Java development tools for QNX, Solaris and Windows hosts implemented as plug-ins to Eclipse, IBM's open-source development tools framework project. Professional and stan-

dard bundles will target only Neutrino, which runs on ARM, MIPS, PowerPC, x86, StrongARM and SH-4 processors.

According to Alec Saunders, vice president of marketing at QNX (www.qnx.com), the reorganization was done in large part because of confusion among the salespeople. "Every negotiation turned into sitting down with the customer and designing his product in order to figure [out] what we needed to sell him. The conclusion we came to was that the way we were delivering our product was confusing. It was confusing for us to manage, and confusing for customers to understand what they were buying," he said.

To solve the problem, Saun-

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Java Solution Orchestrates Web Services

Start-up Collaxa introduces
new ScenarioBean specification

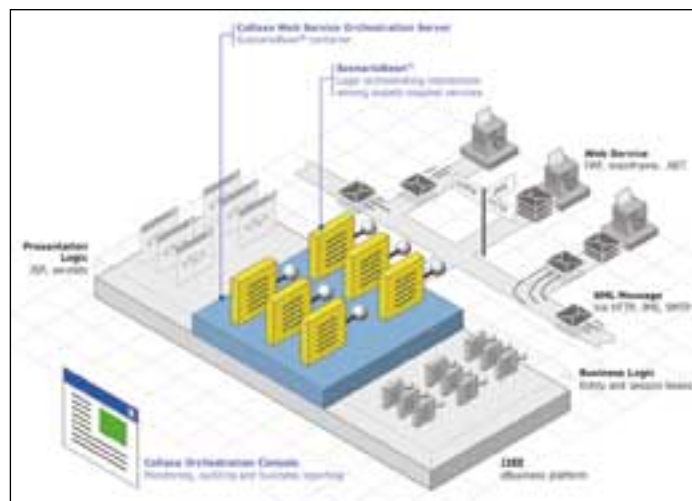
BY ALAN ZEICHICK

A new Java-based Web services orchestration tool was released last week by Collaxa Inc., a start-up launched in late 2000. According to the company, the Web Services Orchestration Server (WSOS) performs functions similar to Microsoft Corp.'s BizTalk Server, but is implemented as a J2EE container that can run on a Java

app server or messaging server.

"We see the need for business process integration increasing," said company CEO Edwin Khodabakhchian, "and EAI products have been successful at addressing the integration problem at the very high end of the enterprise—very expensive and for very high transaction volumes. But we see the emergence

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Collaxa's Web Services Orchestration Server uses proprietary beans to link Web services, XML messages and Java applications.

Apache: Few Checks on License, Registration But corporate-friendly terms put open source at risk, says GNU's Stallman

BY DAVID RUBINSTEIN

When the Apache Software Foundation was formed in the mid-1990s, one of its goals—along with the promulgation of open software code—was to create software for a business purpose.

"We wanted people to be using [the open-source] reference HTTP engine inside their commercial distributions," recalled Brian Behlendorf, co-founder of Apache, who was

working with other programmers on shared source code for a Web server that was to become the Apache server. "We want the code layer to remain free so we don't have to pay the Microsoft tax every time we go to a Web site."

While the software implementations stand on their technical merit, as substantiated by the number of times they have been adopted, it is the Apache Software License that is at the very core of what the foundation calls its "corporate-friendly" approach to development. It is also the license that Richard Stallman, the founder of the Free Software Foundation, has criticized for being too liberal in allowing commer-

cial, proprietary extensions to the codebase.

Indeed, the FSF's GNU Public License (GPL) was designed to make software available to people regardless of their ability to pay, but in exchange requires that any modifications that are to be distributed must be free, as in unfettered, and would also be bound by the terms of the GPL. By contrast, Apache (www.apache.org) places no such recursive restrictions on its code, which is why many companies look to Apache projects to advance their product lines. Behlendorf makes no apologies for this. "We exist to be a petri dish to see if there's enough people willing to work together to solve

a problem. There's a balance of interests here. It's easier to solve problems by hacking against an existing codebase, and it also prevents us from being locked into very expensive implementations."

For Stallman, who claims the moral high ground, there can be no compromise on software licensing and intellectual property. "Proprietary software is anti-social and shouldn't exist," he stated flatly. "There are people who don't care about freedom. I think they're foolish, or worse. I don't want to recommend or encourage people to be amoral."

Moral or not, the Apache license offers clear advantages to companies that adopt its pro-

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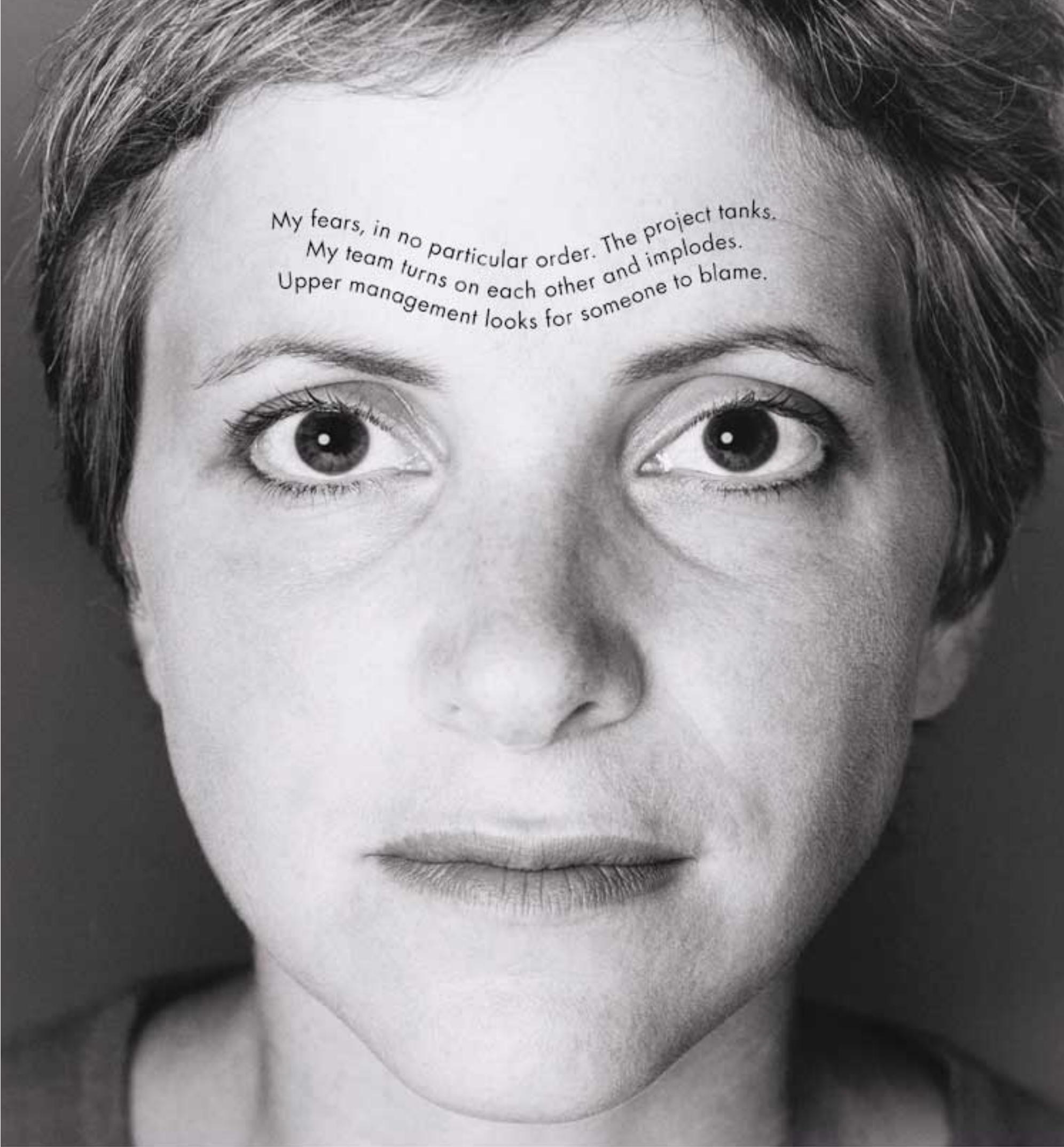
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Who Knows What Evil Lurks in the Hearts of Source Code?

Root-cause defect analysis tools extend debugging to deployed production environments

BY DAVID RUBINSTEIN

Some people consider root-cause analysis solutions to be the barium of the software industry—inject it into your production systems, and follow it all the way through the runtime tract to trace problems plaguing application performance.

Recent solutions show the differing approaches companies take to solving the problem as well as the various labels vendors attach to these tools—whether it's called fault management, root-cause analysis, probable-cause analysis or performance and availability management.

Jeff Mulligan, marketing vice president at InCert Software Corp. (www.incert.com), which sells the Halo and TrackBack analysis tools, cited a study that claimed 40 percent of all unplanned downtime in a production system is

due to a software failure. "But we're still trying to solve the problem the same way we did 20 years ago. You can't replicate an eBay in the lab."

The notion of root-cause analysis is a fairly new one, used to augment testing and debugging done in preproduction environments. The past several years have seen quite a few companies entering the market, offering production-environment execution analysis and fault-finding tools for Java, Windows and other platforms.

The technologies used in these tools vary; some use a logging approach, monitoring and recording changes to variables and memory locations; others set breakpoints or trace execution as activity jumps

from module to module, or from application to application.

Ironically, according to Oliver Cole, CEO of OC Systems Inc. (www.ocsystems.com), which sells a tool called RootCause, this approach may actually lead to poorer software being created. "Even five years ago, the focus was not getting bugs into the field. We had function-point testing and other methods, until people

realized getting rid of bugs completely will never happen. If companies can get a handle on problems in the production environment, they'll pay less attention to bugs. It could result in [lower-quality] software."

It was the maturity and complexity of distributed application plat-

forms, as well as a wider adoption of standards, that has allowed root-cause analysis to grow, said Bob Ure, director of marketing at AltaWorks Corp. (www.altaworks.com), which offers the Panorama tool. "For instance, J2EE defines how applications can and should be built," he said. "Monitoring and management of components in a J2EE environment is easier because we know what to expect from them."

Take a typical customer, Applied Micro Circuits Corp. (www.amcc.com). AMCC, a supplier of integrated circuits for the high-end optical market, was trying to bring out a fairly complex J2EE extranet application to create a collaborative engineering and design environment. It



Altaworks' Ure wants bigger needles, smaller haystacks.

was to run on BEA's WebLogic app server in a system that also had an iPlanet app server running on a Solaris-based server, along with two Oracle databases and one SQL Server database, tied together with a Network Appliance file server. "There were a lot of touch points and a lot of network traffic," said

Bob Averill, e-business architect at AMCC. "The developers said it was running well in tests, but we were hitting bottlenecks in production."

Averill said AMCC tried out Altaworks' Panorama software "just to get a snapshot of how the system was running. We weren't even looking for root-cause analysis. We could see all the databases, CPU,

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MICROSOFT UNVEILS PROJECT 2002

Also releases updated Unix migration software

BY ALAN ZEICHICK

Microsoft Corp.'s updated project-management software, Project 2002, is expected to be available this month, offering not only a Windows-based client but also a .NET Enterprise Server that acts as a separate repository for project data and for system integration.

According to the company, the product will come in two editions. Project 2002 Standard Edition, a Windows client application designed around the Office XP look and feel, adds new wizards for working with project schedules, more flexible options for presenting status updates, and tighter integration with Excel and Outlook. The software also shifts to an XML-based file format with a new object model.

The second version, Project 2002 Professional Edition, adds team collaboration features, and the ability to store information centrally in Project Server 2002, a server application that not only acts as the repository, but also hosts browser-based access to Project 2002's func-

tions. In addition, Project Server supports SOAP and XML-based messaging, according to Microsoft (www.microsoft.com/project).

Per-client pricing for Project 2002 Standard Edition is \$599, and \$999 for Project 2002 Professional Edition. The

base price for Project Server 2002 will be \$1,499, which includes five client access licenses; additional CALs will cost \$179 each. Each user of Project Server 2002, whether using the browser access or the local Windows client, will require a client-access license.

XML Global, Altova Create XML Tool Suite

Integration Workbench combines editor, transformation tool, database

BY CHRISTINA M. PURPI

XML Global Technologies Inc. has released a product suite that combines its existing GoXML Transform Workbench transformation tool and GoXML DB Workbench database tool with Altova Inc.'s existing XML Spy Suite, which comprises a graphical XML editor and validation tool.

The problem the new development suite, called XML Integration Workbench, attempts to solve, explained Bryan Baker, a product manager at XML Global (www.xmlglobal.com), is that when developers are attempt-

ing XML-based enterprise application integration, "the only tools they have available to build complex mapping between EDI and XML cost tens and hundreds of thousands of dollars."

XML Integration Workbench costs \$2,295 per developer seat with an introductory price of \$1,495 until June 30, according to Baker, and is designed for creating applications; the licenses for the transformation and database tools are not for the deployment of applications. "In many cases, people will want to deploy, but in other

cases, they just want to use tools to help them generate and manipulate XML," said Baker.

"Developers can build to their hearts' content. They can build applications; they have full functionality of the product and access to APIs, but they don't have to fork out the full-blown price of a server." If they want to deploy the applications, an enterprise license to the XML Global software must be purchased, which starts at \$10,000 per processor.



The Integration Workbench tool is designed for generating and manipulating XML.

Within the suite, the XML Spy editor runs only on Windows workstations, while the GoXML Transform and GoXML DB tools are available on Linux, Solaris and Windows. ■

JRun 4 Allows for 'Hot' Deployment

BY DAVID RUBINSTEIN

With version 4 of its JRun application server, released last month, Macromedia Inc. claims to make J2EE more approachable to developers by

offering "hot" modification and deployment of code at a server price well below that of competing servers.

"We've really simplified everything about it," said Dan

Murphy, senior product manager for JRun 4. "The use, packaging and pricing are very straightforward."

JRun 4 is now compatible with Sun's J2EE 1.3 specifica-

tion, according to Murphy, who added that all the key J2EE APIs have been updated to offer the latest versions, such as JSP 1.2, EJB 2.0 and JCA 1.0, among many others. He noted

that in JRun 4, the EJB container was completely rebuilt and homegrown; the EJB 1.1 container in earlier versions of JRun was obtained through acquisitions, he said.

The latest version allows for on-the-fly modification of classes or deployment of files or servlets, eliminating the step of having to stop everyone's work while you turn off and restart the server, Murphy said. Any changes within a Java class will be recognized by JRun and implemented automatically, he explained, claiming, "We've created a nonstop server development environment."

Another important new feature, according to Murphy, is the use of Sun's Jini technology for server clustering, which in JRun 4 can occur at the Web server, Web connector and object levels, which he said improves availability and reliability. "It's a peer-based environment, where other environments are master/slave, which creates a single point of failure. Jini eliminates the single point of failure," Murphy said, explaining that in a master-slave environment, if the server with the key deployment data goes down, the entire system fails, whereas in a peer architecture, one server cannot take down the entire system.

As do most other Java application servers, JRun 4 also allows Web services to be published and consumed by offering support for SOAP, WSDL, XML, UDDI and JAX-RPC, the Java API for XML-based remote procedure calls. In addition, the product is tightly integrated with Macromedia's recently released Flash MX, ColdFusion MX and Macromedia Studio MX for the creation and deployment of rich Web applications, he said.

Murphy said the final keys to the new release are that JRun is offered in only one edition, with full capability, and sells for \$899 per server processor. "For what we provide, from other vendors it would cost in the tens of thousands," Murphy claimed. He said the price point will help JRun work down to the divisional and departmental levels within large enterprises that want to Web-enable existing applications. A trial version of JRun 4 that does not allow for product deployment can be downloaded for free at www.macromedia.com/software/jrun/download. ■

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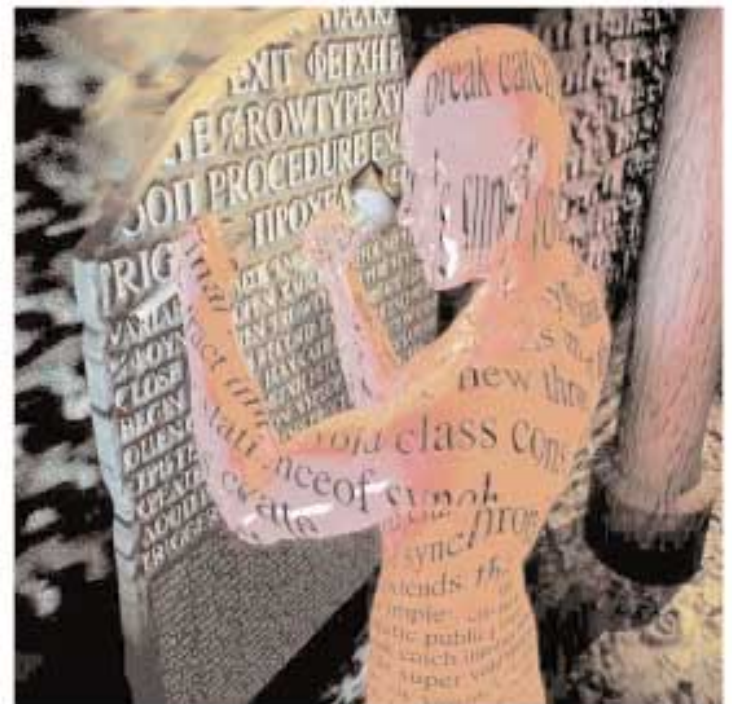
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Infragistics Grids ASP.NET, Releases Source

BY ALAN ZEICHICK
AND DAVID RUBINSTEIN

With a stated goal of increasing customer confidence in commercial components, and thereby encouraging their use, Infragistics Inc. has made the

source code available for the components in its new NetAdvantage Suite. The suite simplifies the company's product offerings for Microsoft developers by creating a single suite that contains code for all of its

supported Microsoft platforms.

"The number of people who may have been afraid of a third-party vendor can now get the source code, so the fear of not being able to see into a black box if the company goes away is

removed," said Bob Wolf, Infragistics' vice president of sales and marketing. "I think the whole component industry has to move to this to remove the barriers to buy."

By setting a \$695-per-devel-

oper subscription price for NetAdvantage Suite with source code, Wolf said Infragistics is trying to expand its share of the market while helping to grow the overall market for reuse. "One of the things that has held back explosive growth in component reuse is price."

By combining all of its Microsoft components—those for ActiveX, Visual Studio .NET and ASP.NET—Wolf said Infragistics is looking to take advantage of what it expects will be wide adoption of .NET. "One hundred percent of the Microsoft market will retool for .NET," Wolf predicted. "No matter where they are, they'll have to move to Web services. It's not just hype."

Because all of the company's components are based on the same Infragistics' framework, according to Wolf, a developer can open a Windows Form and write code for a rich client, then cut and paste the code into a Web Form for publication via ASP onto the Web, all using his Infragistics components. This offers the same functionality and look and feel for the end user, without having to change the underlying application code at all. "Companies can create internal standards for their own look and feel," Wolf said.

The newest piece of the component puzzle is UltraWebGrid 1.0, designed to have the same look and feel as Infragistics' UltraWinGrid client data-grid component, according to the company (www.infragistics.com), which also claims that the data grid can take data from any .NET-accessible source, either at runtime or design time. Developers can choose from more than 30 different predefined grid layouts, or create their own using properties sheets.

The component can be purchased separately, or will be provided at no charge to developers who have purchased the company's UltraWebSuite 1.1 for .NET server-side components, for \$595, or its NetAdvantage Suite of both client-side and server-side components, for \$695. Both suites also have annual subscription models available. An enterprise edition of the suite, for \$995, provides unlimited phone support and a response time of within two hours. ■

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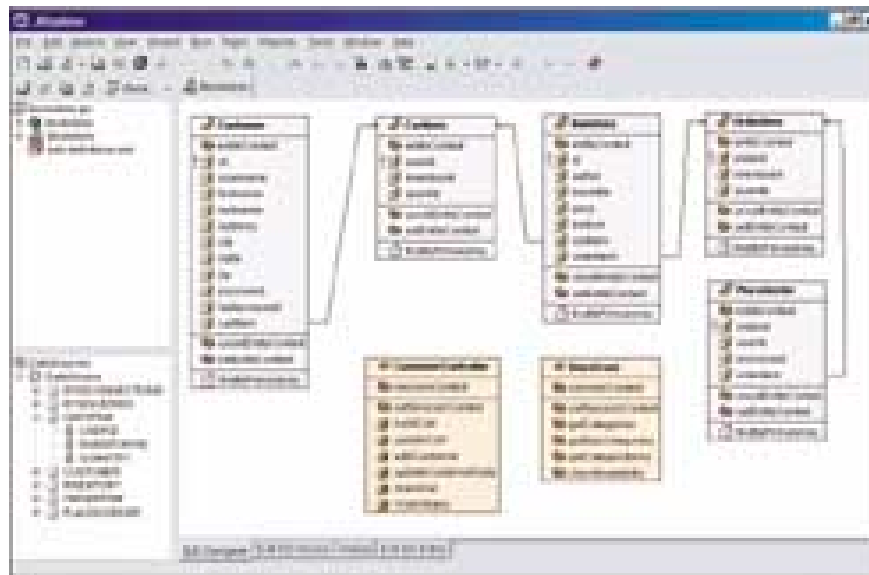
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JBuilder's enhanced EJB designer offers a large workspace for creating, linking Enterprise JavaBeans.

JBuilder Links Testing, Collaboration Tools

BY ALAN ZEICHICK

Borland Software Corp. used its 13th annual user conference as the backdrop for unveiling the next major update of its JBuilder development environment, with new integration with Borland's TeamSource collaboration software, as well as with the Optimizeit product family, which Borland acquired in January. The new JBuilder 7 also will be included in a new Enterprise Studio for Java, which also offers the latest versions of Rational's Rose and Unified Process, Macromedia's Dreamweaver MX and the Optimizeit suite.

"Customers have been asking for more than an IDE," said Tony de la Lama, vice president and general manager of Borland's Java Solutions Group. "From your development environment, you'll have to be connecting, touching, integrating with various parts of the application development life cycle, from design tools to source management to testing—these sorts of things. That's what we're really doing with this release: We're connecting through the TeamSource product and the Optimizeit product."

Axel Kratel, senior product manager for Java solutions, said that also new to JBuilder 7 will be configuration management. "This relieves a big pain point for developers around the build process for complex enterprise applications." He explained that JBuilder now uses Ant, the open-source build tool from the Apache Software Foundation's Jakarta project, for managing builds, and added that "even JBuilder itself is becoming compliant to this new emerging standard."

JBuilder is more than an IDE, stressed de la Lama. "We're also managing technology change. In this release, we'll support JDK 1.4, the latest standards in Web services, and in addition

to supporting our own application server, we'll also be supporting BEA's WebLogic 7.0 Server."

Kratel also indicated that new for JBuilder 7 is an enhanced EJB 2.0 designer. "You can now literally sketch EJBs with it. You can drop EJBs onto the design surface before you even have the database schema. What we did in JBuilder 6 was allow you to go from the database schema to the EJBs, and now we let you do the EJBs ahead of time, and you can generate the schema afterward."

In addition, the designer lets developers work with complex projects with more than 100 beans, Kratel claimed. "Having a single design surface, after you have a lot of beans, means you'd be doing a lot of scrolling, so we've introduced multiple design panes."

JBuilder 7 now also has new code-refactoring features to extract methods and change method parameters.

Pricing has remained constant, with the per-developer-seat pricing for the full-version JBuilder 7 Enterprise at \$2,999. Borland offers less expensive versions, as well as a bundle with the Optimizeit suite for \$3,999 per developer. The Enterprise Studio for Java, which includes JBuilder 7, Optimizeit and the Rational and Macromedia tools, is priced at \$5,999 per developer.

At the conference in Anaheim, Calif., Borland also released version 4.2 of the Optimizeit suite, which comprises three separate utilities for code profiling, code coverage analysis and thread debugging for Java. The new release allows "one-button" profiling from within JBuilder 7, according to the company, as well as compatibility with a wider range of app servers. The suite is priced at \$1,599 per developer, and the individual tools can be purchased for \$699 each. ■

Software AG Ships XML Mediator

BY CHRISTINA M. PURPI

Software AG has released XML Mediator, a new integration and exchange server that the company (www.softwareag.com) describes as a broker for XML information moving into

and out of organizations.

"The differentiator is that Mediator is based on XML, an open standard," explained Joe Gentry, senior director of product marketing, "whereas other companies have propri-

etary messaging infrastructures where you have to buy into their entire product line."

According to Gentry, XML Mediator is able to aggregate and transform information based on programmable busi-

ness rules and sequences. "It's an environment that generates XML behind the scenes to move documents around and transform them."

There are two parts to XML Mediator, according to Gentry: a

server and a development workbench. "Once the sequence or application is constructed in the development tool, they move it and make it available for production on the server," Gentry said.

XML Mediator is currently available for \$25,000 per server processor, and runs on Solaris and Windows. ■

COLLAXA

◀ continued from page 1

of Web services and the increasing adoption of Java as catalysts for creating a new approach to tying applications together into end-to-end business processes."

It's all based on a new Enterprise JavaBean type created by the company, called a ScenarioBean. "It's a JSP-like abstraction; you might call it a JSP for orchestration," Khodabakhchian said. "Developers can use ScenarioBeans to assemble multiple Web services, some of them being asynchronous, some of them being synchronous, and some of them throwing exceptions and time-outs, into a multi-step business transaction or a business process. Because of exception and decision support, the orchestration also has support for 'people' transactions."

According to Collaxa CTO Doron Sherman, the company (www.collaxa.com) is evaluating the option of submitting a JSR for ScenarioBeans to the Java Community Process.

The WSOS is built on XML, SOAP, WSDL and ebXML, and also Java-specific specifications such as JavaServer Pages and JMS, explained Khodabakhchian. "But we're not talking about putting lipstick on top of existing technology; we're talking about a solution that's fundamentally built on those standards."

He said that Collaxa's ScenarioBean is similar to IBM's Business Process Bean, but implemented differently. "From outside, IBM's looks like a bean, but from inside it looks like XML. It's very tool-centric. The ScenarioBean is similar to JSP."

Khodabakhchian added that the WSOS approach offers manageability through its use of the JAXM specification. The WSOS container collects management information, which he said is exposed using the JMX specification for monitoring by external applications through an HTML-based interface.

Developer licenses are free, and deployment is priced at \$10,000 per server processor. ■

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JTransit Drives CFML to J2EE

Code-migration utility bridges gap between ColdFusion, Java

BY DAVID RUBINSTEIN

Whereas Macromedia Inc.'s upgrade to its ColdFusion server is meant to ease scripting-language developers into the

world of J2EE and .NET, a year-old start-up called JTransit Inc. wants to help companies migrate their existing tag-based applications to Java.

JTransit believes that for developers coding in tag-based languages, deployment is the biggest issue. To that end, the company's new product, JTransit

2.0, is designed to allow ColdFusion or Tango developers to deploy their Web applications onto any J2EE-compliant application servers, to take advantage

of their scalability as well as to unify existing tag-based applications with JavaServer Pages, Enterprise JavaBeans and other J2EE technologies.

The JTransit solution consists of a runtime that holds a back-end Java library and runs tag-based language code in J2EE containers, and a compiler that translates source code into both Java source code and bytecode, according to JTransit CTO Chris Kelch. JTransit supports about 180 different tags, Kelch said.

Kelch claimed Macromedia's solution is limited to working with ColdFusion Markup Language code. He also said the Macromedia solution will generate only bytecode and not source code. According to JTransit CEO Patrick Forden, his company's solution "gives developers the opportunity to take ColdFusion apps and convert them to Java in a one-time shot, and then code in Java, or still use the ColdFusion development environment and deploy to J2EE."

The company launched two products last month: RedLine, a load-testing engine; and FrontLine, a configuration management utility that automatically installs with JTransit Runtime and can be used to deploy newer versions of files automatically to a cluster of machines. A nightly build can be set up, for example, that will update JTransit software as well as third-party libraries such as Velocity. "We encourage people to test every time," Forden said. "There is a significant decrease in QA time as test cases are run at each build and load-testing is done at the final build."

JTransit (www.jtransit.com) also offers a global peer-to-peer monitoring service via FrontLine for \$50 per month, which provides access to data from monitored sites in what the company claims is an average of 30-second response time. FrontLine Pro incorporates protocol servers for e-mail, SMTP or FTP. "The things you do on the Internet are more than hit Web sites," Forden said. "A lot of applications require file up- or downloading, and with this, developers can write their own mail server with ColdFusion code for their applications."

The runtime sells for \$1,500 per processor; the compiler sells for \$1,500 per developer seat. ■

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ROOT CAUSE

← continued from page 5

memory and network latencies all in their console."

BELOW THE SURFACE

But Averill said when AMCC started using the analyzer to drill down further into system bottlenecks, problems such as app server settings not being optimized to the database connector pools were discovered, and his team even went so far as to discover that an EJB within the system was calling outside its container to a noncontainer-managed object. "We found bad beans and we have developers working on it," Averill said. "The complexity of the [J2EE] environment is staggering for a small shop."

It is this growing acceptance of these complex platforms, such as J2EE and Windows and .NET, by companies that might not have the requisite expertise that spurred OC Systems' Cole's belief that the quality of software being created is declining.

"You're getting a whole bunch of companies, whose core competency isn't writing software, distributing applications on Java servers," he said. "By making it easier to build these applications, you're creating a more buggy environment."

Cole also cited a shift in the mentality of companies hiring developers. "Ten years ago, if you asked two developers if they could produce software without bugs, and one said yes and the other said no, we'd have hired the developer who said he could produce software with no bugs. Today, we'd say he's unrealistic."

NO SILVER BULLET

Altaworks' Ure agreed the software development industry has come a long way in terms of the kinds of applications being created today and in the ways they're created, but said, "No product can guarantee they'll find the problem 100 percent of the time."

Altaworks' solution, Panorama 1.5, centers on what Ure called probable-cause analysis—the ability to determine the probability that any given issue is the actual root cause of the problem. For instance, he said, if there is a logjam retrieving data, the Altaworks solution will tell you that there is an 80 percent chance the problem is in the database application and a 50 percent chance the root-

cause problem is in the transaction server. "It takes you from searching for a needle in a haystack to making the needle bigger and the haystack smaller." New to Panorama 1.5 is the ability to monitor method-level performance; in previous versions monitoring stopped at the EJB or servlet levels. Also, sup-

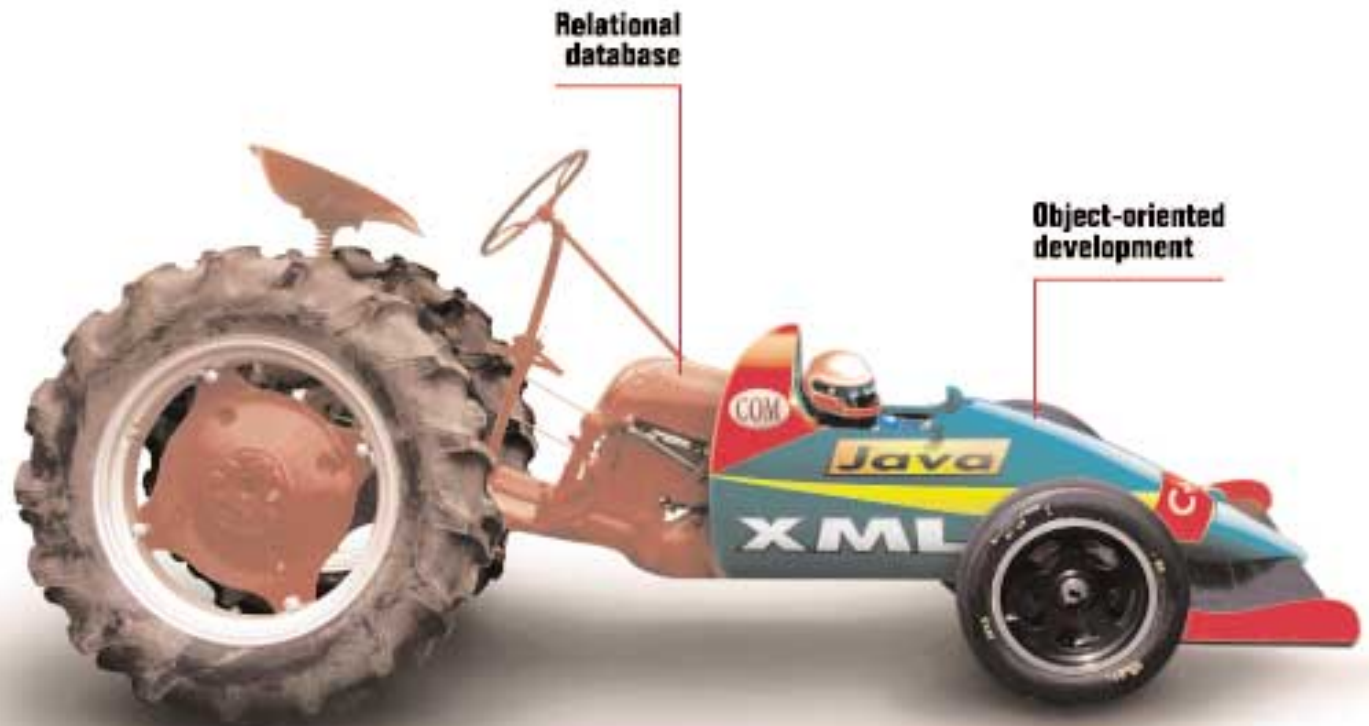
port for IBM's WebSphere 4.0 and DB2 has been expanded.

InCert tries to solve the problem by helping developers make corrections in the source code. "We're constantly keeping track of the program's execution history in a memory buffer," Mulligan explained of the company's Halo solution. "When software throws

an exception, we'll do a snap trace and persist the contents of the memory buffer into a trace file. Opening the file in our viewer allows developers to step line by line through the execution history forward and backward, and each step is correlated with a line of source code."

Mulligan claimed InCert has

managed to create a way to instrument a program without any changes to source code, providing such detailed cover of the application that on the first fault, "you get all the detail you need to fix the problem." InCert is expected to release into beta a .NET version of Halo by the end of the month, Mulligan said. ■



If your back-end database isn't a good match for your front-end development, you need a new database. Caché, the high-performance database from InterSystems, is a powerful fusion of today's mainstream technologies: objects and SQL.

Unlike Oracle and other relational databases, Caché takes advantage of its efficient multidimensional data engine to implement an advanced object model. It doesn't try to hide a cumbersome relational engine beneath object-like wrappers.

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News Briefs

COMPANIES

MetaMatrix Inc. has signed an agreement with **Versata Inc.**, so that developers who use MetaMatrix model-driven integration software can integrate it with Versata's business logic tools . . . **Adobe Systems Inc.** has won its patent-infringement lawsuit against **Macromedia Inc.**, and has been awarded \$2.8 million in damages. The suit contended that Macromedia violated Adobe's patent on a reconfigurable tabbed tool palette. But Macromedia won a countersuit, which claimed that Adobe infringed on three of Macromedia's patents; the award there was \$4.9 million . . . **Microsoft Corp.** will be acquiring Navision, a Danish company focusing on accounting-oriented business software, for \$1.3 billion in stock and cash. Navision's products will be folded into Microsoft's Great Plains product family.

PRODUCTS

Elansoft Infotech Ltd.'s new SVG charting component, **AgileBlox Chart**, is entering beta. The Java component uses scalable vector graphics to render drawings . . . Mutek Solutions Ltd.'s **AppSight** black-box testing software for Windows has been updated for .NET, and can now help determine the causes of app failures in Web applications using ASP.NET and ADO.NET . . . I-Logix Inc. has added UML-compliant use-case diagrams to its just-released **Statemate Magnum 3.1** embedded application modeling system. This updated version also has new features for tracking changes . . . New Atlanta Communications LLC has updated its **JTurbo** JDBC driver to comply with Sun's new JDBC 3.0 spec. JTurbo 3.0 is a Type 4 database driver specifically for accessing Microsoft's SQL Server from within Java applications. License costs start at \$595. The company also released the beta of **BlueDragon**, a Java-based app server that ▶ continued on page 16

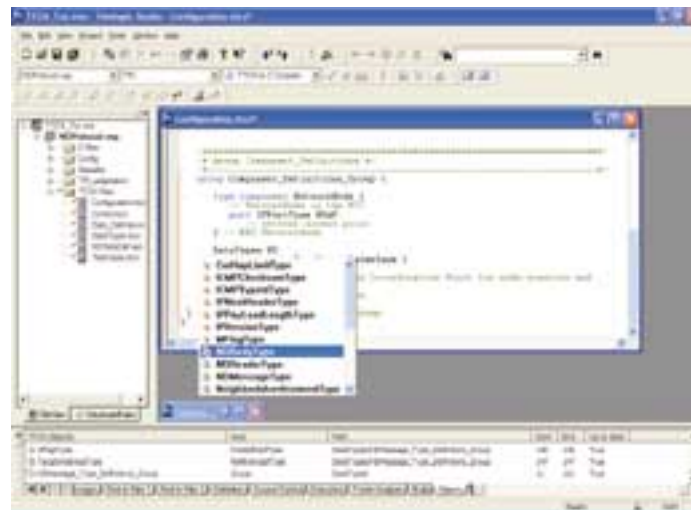
Telelogic Unveils Test Tool For Telecom, Aerospace

BY CHRISTINA M. PURPI

Telelogic AB has released **Tau Tester**, a new test tool for measuring compliance with telecommunications, military and aerospace specifications.

Tau Tester is based on TTCN-3, the standard developed by the European Telecommunications Standards Institute and the International Telecommunications Union that is applicable for testing communications applications, such as those using the 3G or GSM specifications, or those involved in implementing wireless LANs.

Tau Tester checks to make sure [the product] meets requirements and performs as expected, said Michael Donner, vice president of marketing and communications at Telelogic (www.telelogic.com). It has test authoring, test analysis, test execution, debugging and configuration management features.



The test authoring feature lets engineers write test scripts in TTCN-3.

TTCN-2, an older version of the standard, was able to perform only performance testing within the telecommunications industry. TTCN-3, the latest version, which was released toward the end of 2000, is able to test applications in industries such as mili-

tary, aerospace and transportation, as well as those that utilize a wide range of protocols, according to Matt Greney, Tau product marketing manager.

Tau Tester is currently available for Solaris and Windows. Pricing starts at \$6,995 for a test case writer. ■

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Alexsys Corporation

'Edge' Shows Come Under One Roof

BY CHRISTINA M. PURPI

Three of SYS-CON Media Inc.'s developer-oriented conferences have been bundled up into one large event, with the unwieldy name Web Services/JDJ/XML Edge East. The combined event is set to take place from June 24-27 at the Jacob K. Javits Convention Center in

New York, and will include keynotes, panels and sessions from each of the three original shows, Web Services Edge, JDJ Edge and XML Edge.

Industry figures such as ILOG Inc. senior vice president of research and development Jean-François Abramatic, Microsoft Corp. chief technology

evangelist Simon Phipps, and SilverStream Software Inc. CEO David Litwack are scheduled to take part in keynote panels discussing such various topics as integrating applications with Web services, and choosing between J2EE and .NET.

Also at the combined show will be a three-day Java University Program, managed and produced by Sun Educational Services. More details on that portion of the events can be found at www.sun.com/javauniversity. ■

Fawcette Brings VSLive to New York

BY ALAN ZEICHICK

While this summer's VSLive conference in Manhattan won't have the drama of the spring's huge San Francisco event—at which Microsoft Corp. officially shipped Visual Studio .NET—this shorter event will deliver more than 40 educational sessions for Windows developers.

Before the conference itself begins, Fawcette Technical Publications, the show's owner and producer, is also offering two full-day workshops on Sunday, one focused on making the transition rapidly from Visual Basic 6 to .NET, the other on XML and SOAP for expert developers. There are also three full-day post-conference workshops on Wednesday, June 19.

In addition, the VSLive conference will have two keynote presentations by Microsoft executives. On Monday, Ed Kaim will discuss mobile application

development using Visual Studio .NET, and on Tuesday, Jay Paulus will talk about the use of Windows .NET as an application server. ■



CONFERENCE:

June 16-19
New York Marriott Marquis

CONFERENCE HOURS:

Sunday Tutorials, 9 a.m.-6 p.m.
Monday, 9 a.m.-8 p.m.
Tuesday, 9 a.m.-5:15 p.m.
Wednesday, 9 a.m.-6 p.m.




EXHIBIT HOURS:

Monday, 11 a.m.-3 p.m., 6 p.m.-8 p.m.
Tuesday, 10 a.m.-3 p.m.


KEYNOTES:

Monday
9 a.m., "Mobile Application Development in Visual Studio .NET," Ed Kaim, Microsoft Corp.
Tuesday
9 a.m., "Windows .NET Server—The New Breed of Application Server," Jay Paulus, Microsoft Corp.

www.vslive.com

 CONFERENCE: June 24-27 Jacob K. Javits Convention Center New York CONFERENCE HOURS: Monday , 9 a.m.-5 p.m. Tuesday , 8:30 a.m.-6 p.m. Wednesday , 8:30 a.m.-5:30 p.m. Thursday , 8:30 a.m.-3:45 p.m. EXPO HOURS: Tuesday , 11 a.m.-5 p.m. Wednesday , 11 a.m.-5 p.m. Thursday , 11 a.m.-4 p.m.	 KEYNOTES: Tuesday 9:45 a.m.-10:30 a.m., "Where Computing Is Going for the Enterprise," Don Ferguson, IBM Corp. 10:30 a.m.-11:30 a.m., "Integrating Applications With Web Services," keynote panel 1:30 p.m.-2:15 p.m., "Web Services: A Pragmatic Approach," Peter Hoversten, Sybase Inc. 2:15 p.m.-3:00 p.m., "Supercharging Java With Web Services," keynote panel Wednesday 9:45 a.m.-10:30 a.m., "Web Services: Integration Technology for the 21st Century,"	 Barry Morris, Iona Technologies Inc. 10:30 a.m.-11:15 a.m., "Immediate ROI With Web Services," keynote panel 1:30 p.m.-2:15 p.m., "Enterprise Web Services: The Next Level of Integration," Philip Merrick, WebMethods Inc. 2:15 p.m.-3 p.m., "Where's the ROI—Economic Models and Other Business Issues," keynote panel Thursday 9:45 a.m.-10:30 a.m., "The Great Debate: J2EE Vs. .NET," keynote panel www.sys-con.com/webservicesedge2002east
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AS DAWN BROKE, CODY REALIZED HE WAS ILL-EQUIPPED...



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News Briefs

MORE PRODUCTS

← continued from page 14

runs ColdFusion Markup Language within JavaServer Pages. Blue-
Dragon runs on Microsoft's IIS, the Apache Web Server and the Sun
ONE Web Server . . . Trolltech AS claims that its new **Teambuilder** col-
laborative development software speeds compilation by using peer-to-
peer distributed computing to share tasks across unused workstation
processor cycles. The tool works only with the GNU C/C++ compiler on
Linux workstations, and costs \$750 for five workstations, \$1,200 for
10, and \$1,800 for 20 . . . Sun Microsystems Inc. was scheduled to ship
Solaris 9 for its SPARC processor on May 22; the company still hasn't
committed to releasing the operating system for Intel processors
. . . **Visual Build Professional 4.0**, an updated build tool for Windows
from Kinook Software Inc., now includes an integration with Visual Stu-
dio .NET, as well as integrated script editing and execution, custom
action components and programmable automation. The tool costs
\$149.95 per development workstation . . . Microsoft Corp. this summer
will release the beta of its **Systems Management Server 2003**. The
new release emphasizes management of Windows-based mobile com-
puters, with features for background data transfer of software
updates, awareness of mobile users' locations and bandwidth, and
tighter integration with Active Directory . . . Microsoft also has
released its **SQL Server 2000 Driver for Java Database Connectiv-
ity**, a Type 4 driver that allows Java and J2EE users to integrate with
SQL Server 2000 databases, available now for download at
www.microsoft.com/sql/downloads . . . Fujitsu Software Corp. has
released version 5.1 of its **Interstage I-Flow Business Process Man-
agement** engine to include new features such as an SMS adapter that
gives mobile users access to business processes via a cell phone and
the use of Java to manage customization and integration . . . Red Gate
Software Ltd. is offering an update of its SQL code comparison tool.
SQL Compare 2.0.1, due out in June for \$195, includes better support
for data-type changes, dependencies and SQL Server 2000's view trig-
gers and indexes . . . Compuware Corp.'s **Abend-AID Fault Manager
2.5** now has fault collection and detection on Windows NT/2000 Serv-
er, integration with Peregrine and Vantive's help-desk systems, and
integration with IBM's Tivoli and Computer Associates' Unicenter TNG
. . . The 4.0 version of **OneSight**, an application performance suite
from Empirix Inc., includes new distributed data collectors, the ability
to monitor services remotely from outside a firewall, and new behav-
ior-based filters for the software's alerting functions. Ship-
ping as of mid-May, the software's price starts at \$15,000
. . . Sims Computing Inc. has updated its **Flux** Java-
based workflow scheduling component. Version 3.1 works
with JMS-based triggers and can communicate using
XML . . . LogicLibrary Inc.'s **Logidex 1.3**, a development
asset library, now includes expanded search functions
and new abilities to store and retrieve Web services, components, XML
schemas and patterns. It also includes tools for allowing developers to
subscribe to particular assets, and to define assets using configurable
templates . . . IBM Corp. claims that its updated **DB2 OLAP Server
8.1**, released in May, is the first to combine hybrid analysis of relation-
al and multidimensional online analytical processing with data mining
. . . Liveware Publishing Inc. has released **RattleRR**, a business intelli-
gence package for Windows-based Web servers. The software is con-
trolled by ASP scripts, and results are displayed in an ActiveX control.
RattleRR is priced at \$3,000 per server for unlimited users, and
includes a license for the company's **R&R Data Warehouse** software.



PEOPLE

Robert Walmsley is the new president and COO of Cape Clear Soft-
ware Inc. Previously, Walmsley was VP of international sales for Iona
Technologies plc . . . Palm Inc. has promoted **Todd Bradley** to
president of its solutions group, which builds its hardware, applica-
tion software and add-ons. Previously, Bradley was the group's COO
. . . **Christopher Paisley** has joined Persistence Software Inc.'s board
of directors. Paisley is an executive professor of accounting and
finance at Santa Clara (Calif.) University, and previously was SVP of
finance and CFO of 3Com Corp. ■

APACHE

← continued from page 1

jects, and arguably to their cus-
tomers. "Where we have an
opportunity to work with open
source, it's a great thing. But
you need to protect yourself in
some way by keeping your
intellectual property protect-
ed," said Libby Freligh, prod-
uct manager at Macromedia
Inc., which has incorporated
the Apache Axis SOAP engine
into the recently released Cold-
Fusion MX server. "With GPL,
you're opening up all the code,
and for a commercial company,
that's not a viable solution."

Macromedia, Freligh said,
had engineers working on the
Axis engine, and believes that
Apache provides a forum for
communication as well as a
place to keep an eye on what
that development community is
working on. "You look at a
SOAP engine, where the key is
interoperability. What better
way to ensure interoperability
than for the engineers to work
with engineers from many dif-
ferent companies" through the
Apache development commu-
nity, she said. While there is no
protection against a company
taking an Apache project and
branching it into its own prop-
rietary solution, Freligh said that
for some projects and products
that require interoperability,
branching would defeat the
whole purpose.

The danger of forking is a real
one, as open-source advocates
cite the fragmentation of the
Unix operating system as some-
thing that could occur under the
liberal Apache license.

"Apache wants to take the
risk" of forking, accused Stall-
man, who said that if Apache is
really the petri dish that Behlen-
dorf described, then "it's a shame
to see nonfree versions built on
top of that [code]. Our goal is to
spread freedom and community.
They have built a community
because their version is free.
Their motives are different than
ours." That's why the GPL, Stall-
man explained, "restricts [com-
panies] from restricting you."

THE JAVA CONNECTION

And what about the motives of
Sun Microsystems Inc., the
keepers of Java—the platform
for many of Apache's most pop-
ular projects, such as the Tom-
cat servlet engine and Struts
application framework? Sun
fears the forking of the Java
platform through proprietary

Using GPL

*Is encroaching on our rights
To encroach on yours.*



Haiku by
Free Software Foundation's
Richard Stallman

implementations, as witnessed
by its long-running feuds with
Microsoft Corp. and IBM
Corp., but has dribbled out
pieces of the platform as open
source, and now has agreed to
Apache's demands that the Java
API test kits be made available
without prohibitive licensing
fees and that proposed changes
on which Sun is the specifica-
tion lead can have open-source
implementations.

But Stallman and Robin
Miller, editor-in-chief of the
Linux.com and NewsForge
.com Web sites, do not believe
that goes far enough. The move
by some companies to release
some code as open source "is
the dumbest thing I ever heard
of," Miller said. "The people
doing the innovating and doing
the creative work will never see
the code. It's really just a way to
tighten the locks by a few com-
panies, and it's more cynical
rather than truthful."

"If Sun open-sourced Java
and did it intelligently," he con-
tinued, "they'd still have a busi-
ness, by selling augmented
tools. But they'd have to be will-
ing to compete and mix it up."

Stallman, when told of the
Java Community Process con-
cessions to Apache, took an even
harder line: "If some of these
reference implementations are
released as open-source and free
software, it's something we
could use in the free world. But
the Java libraries are not free
software; they are unusable in
the free world. From our point
of view, we won't use a program
that's free if it requires a nonfree
program to run it."

According to Onno Kluyt,
manager of the JCP Program
Management Office, the lengthy
relationship between Sun and
Apache—which predates the
JCP—and the success of the
Tomcat API project are the
roots of the group's influence. "I
think Apache, for Sun, is a con-
venient place to do certain types

of development, and to plug
into developer resources and
interest [outside of Sun]."

Why is Apache so influen-
tial? "They have a couple of
advantages over other groups,"
said Kluyt. "First of all, they are
pretty well organized and
focused on what they want to
do, and understand what their
expertise is. Second, for compa-
nies like Sun, IBM, Oracle, HP
and Apple, that all work with
Apache, it's that the Apache
license makes it easy for a com-
mercial organization to collabo-
rate with them. It's much easier
to work in with commercial con-
cerns than other licenses."

Kluyt emphasized that de-
spite appearances, the deal
negotiated between Sun and
Apache for providing access to
Java technology and test kits
wasn't just to benefit Apache.
"Apache made it very clear that
they didn't want just an Apache
deal," he said, "and we very
much appreciated that. Apache
always drove for a general solu-
tion, and I think the reason you
see the 'A' word so often [in the
JCP documents] is that you
have to have practical exam-
ples. Sun used Apache as a
model: At a minimum, things
must work for Apache."

And Apache works for the
development community, Miller
said, because it is run by what
he called "a technical meritoc-
racy. They're not marketing
people or politicians or public
speakers. They're merely tech-
nically brilliant."

While clearly there's more to
Apache than technical bril-
liance—there's also the dogged
pragmatism that led to the
Apache license and its success at
negotiating with companies like
Sun—there's no doubt that as
long as Apache can maintain its
technological leadership, devel-
opers and vendors alike will be
content to follow its directions. ■

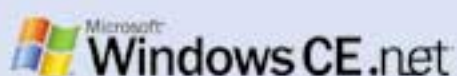
Alan Zeichick contributed to
this story.



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New RIM Handheld Puts It All Together

Latest Blackberry device for GSM/GPRS adds voice, SMS, Java runtime

BY EDWARD J. CORREIA

With the recent release of the Blackberry 5810 wireless handheld computer, enterprise wireless communications developer Research in Motion Ltd. (RIM) has added a mobile phone, Java and SMS messaging capabilities and GSM/GPRS network support to its newest handheld computer, giving enterprise developers a new set of capabilities to work with when building solutions for mobile executives.

By now, most developers have heard of Blackberry, a series of handheld computers that when linked with RIM's enterprise server software allow mobile executives to track appointments, browse the Internet, access enterprise applications and send and receive e-mail over Motorola's DataTAC and Cingular's Mobitex wireless networks.

Dave Yach, RIM's vice president of software, said that the addition of Java gives developers a new level of safety and control over devices that the C-language programming of previous models did not. "Because Java uses a virtual machine, you can lock it



RIM's 5810 marks the company's move to all-Java devices.

down and control its behavior. C code with runaway pointers can cause all kinds of havoc on the wireless network. The protected environment of Java has no pointers and allows the device vendors to ensure that this can't happen." RIM (www.rim.com) is moving to all-Java development beginning with the J2ME-based 5810 for the Americas and the 5820 for the European market, Yach said, the latter of which does not include voice capability.

Whether building in Java or

C, developers tasked with mobilizing enterprise applications often fall into a trap, Yach warned. "The first inclination is to build a wireless browser application because it allows them to create the application with tools and techniques they are familiar with." And while the browser model also simplifies application deployment and device configuration concerns, Yach said it will only get them so far. "There are limitations. The networks are still not fast, and you end up waiting a long time for responses. Even four or five seconds per screen can add up." Then there's the problem of connection intermittence. "If I am a repairman going in a basement where there's no coverage, a browser doesn't do me a whole lot of good," he said. Blackberry uses local caching whenever possible.

"What a lot of people end up doing is what I call 'right-sizing,'" which he explained was making the majority of an application's least-used functions available through a browser, while reworking the most common functions so that they are

local to the device and available all the time. He illustrated his point with reference to a customer relationship management application. "Say I've found that in my CRM system, salespeople look at contact and back-order information most of the time. I develop [those functions] as a persistent application that will save salespeople time, and perhaps the functions that they only use occasionally, I will leave as browser-based."

Ironically, when developers move their desktop applications to a mobile device, Yach said the result often is a better user experience on the mobile device. "What tends to happen with a big screen is you get a kitchen-sink approach; everything is on there that you could possibly ever use. But you can't just take a 21-inch screen and squeeze it onto a 2-inch screen.

Since somebody's taken the time to think it through, a small device ends up having only the things you actually need."

In addition to interface complexities, complications of

developing browser applications, which in RIM's case use the Wireless Application Protocol, include selecting a suitable method of formatting the pages. Yach said this is best done manually. "With WAP, you have to redo your pages. I have not seen automatic transformations done well. That's really hard to do automatically. If I could follow the eyeballs on the big screen and see what the user actually looks at, then I could predict [what they need]. But right now it requires smart developers to think through the development."



Java apps are easier to control than C apps, says RIM's Yach.

The Blackberry Enterprise Server costs \$2,995, including 20 user licenses, and runs on a company's existing Microsoft Exchange or Lotus Domino server. Additional user licenses are available in 10 packs for \$450. VoiceStream

charges \$499 for the 5810 plus about \$40 per month for its basic plan, which includes unlimited e-mail, 1MB of Web data transfer and national coverage in the U.S. ■

AvantGo Offers Application Synchronization

Company says its embrace of standards reduces on-device coding

BY EDWARD J. CORREIA

Mobile software developer AvantGo Inc. in May was scheduled to release M-Business Server 5.0 Application Edition, a version of its synchronization platform that it claims can dramatically reduce the amount of device-specific code necessary to develop client applications, thanks to added support for Document Object Model, JavaScript, Cascading Style Sheets, HTML 4.0 and other common Web specifications.

The M-Business platform consists of server software for Linux, Unix or Windows servers and a client component for devices running Palm OS, Pocket PC or Research in Motion's Blackberry operating system. According to Felix Lin, AvantGo's vice chairman and co-founder, "The fact that you have a browser on the device means

you don't have to do a lot of programming to do content rendering or display. The beauty of the new edition is that much more of the application that would previously have to be written in C can now be written using scripting languages and Web standards." The applications potentially can "look and feel more like the quality you're familiar with on a desktop rather than lots of static text on a page that you have to scroll through," he added.

For companies needing to deploy more functionality than a browser can handle, there's portable on-device services, or PODS, Lin said, which he described as a plug-in interface for developing extensions to the AvantGo client. "A Web browser doesn't give you elec-



Web apps work the same on any supported device, says AvantGo's Lin.

tronic signature capture capabilities, or the ability to perform complex calculations. You're going to have to write C or Java code for that, [but] you don't want to redevelop functions for each device. With PODS, you can build an application using radio buttons, drop-down lists, form fields—anything you can use on a desktop, you can do for a mobile device. And once you conform to those standards, the app will work on any of the [supported] devices."

The M-Business platform also gives developers access to an on-device database API, Lin said. "This is huge, because you're not always connected. The benefit of having persistent on-device data is that when you're connected, you can

instantly send transactions, and if you're not connected, you can still get a substantial amount of work done and send transactions later." The new client software also supports XHTML 1.0, JPEG, color text and multiple fonts.

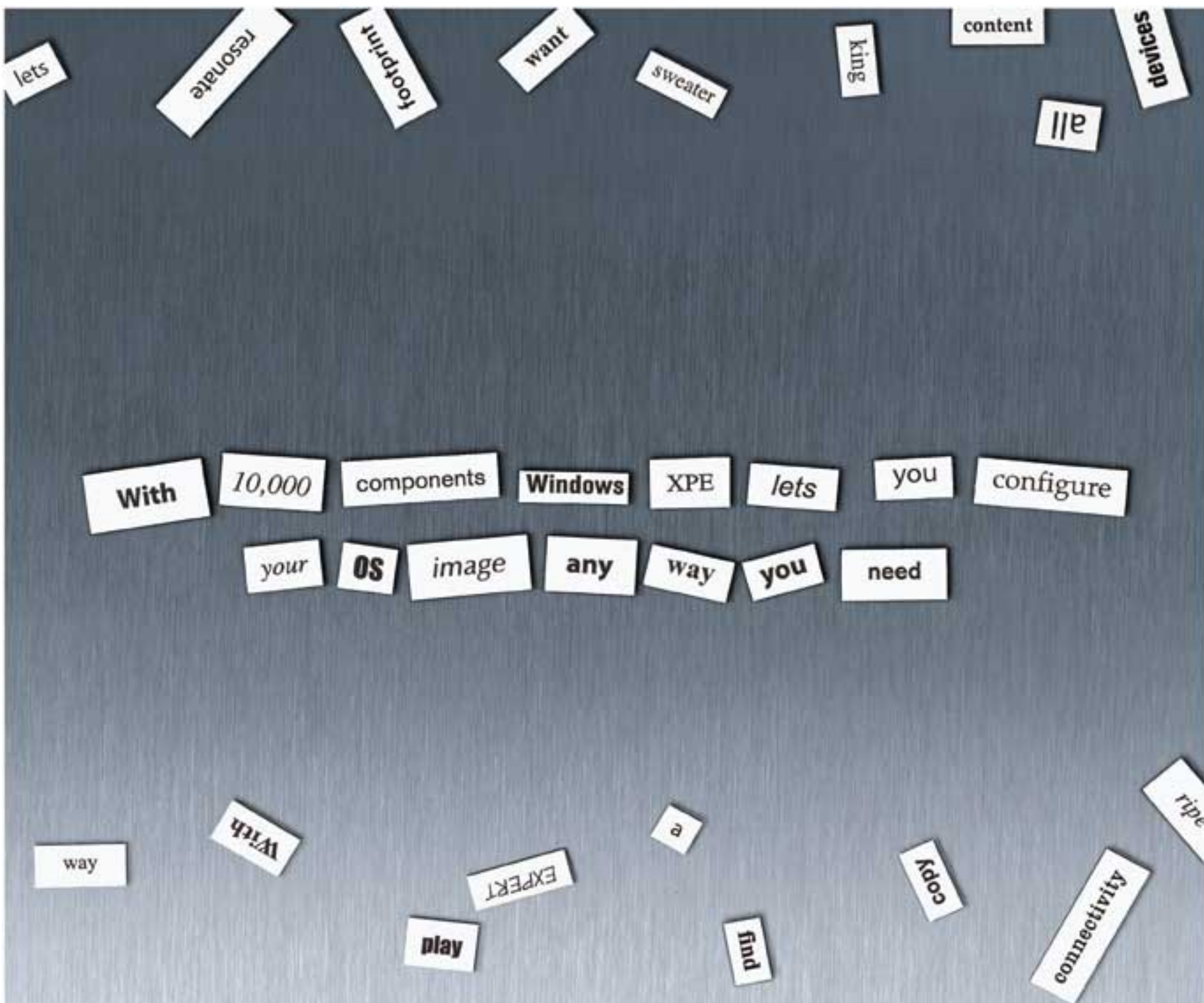
Lin said that the simplest deployment scenario is for enterprise applications that already are accessible via the Web. "You go to your AvantGo client software and key in the URL. The application would work exactly the same [as on a desktop]." And Lin asserted that content never requires any AvantGo-specific tags. "We spent an enormous amount of time making sure that content would not require tagging," he said. One optional tag indicates whether content is already formatted for handheld devices, he said, in which case Avant-



AvantGo Client now supports DOM, CSS and HTML 4.0.

Go's transcoding is disabled.

M-Business Server 5.0 Application Edition runs on Linux, Unix and Windows servers and includes client software for Blackberry, Palm OS and Pocket PC. Available in packs of 10, it is licensed at \$249 per developer or mobile user. The company (www.avantgo.com) is offering free copies through Sept. 1, Lin said. ■



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Wind River Manages Remote Devices

Additional product betas promise enhanced security, iSCSI

BY EDWARD J. CORREIA

Last month, embedded developer Wind River Systems Inc. released beta versions of several developer tools it plans to

make available this year. Among them was WindManage, a suite of tools that it says will permit developers to build management interfaces for monitoring

and control of remote devices running its VxWorks, VxWorks AE and BSD/OS operating systems; pSOS is not supported.

Currently in beta and set for

release this month is Tornado for Intelligent Network Acceleration (TINA) for iSCSI Initiators, a version of the company's Tornado IDE that it says will simpli-

fy the job of building IP-based storage networking devices such as IP-based host bus adapters and storage routers. The product reportedly will combine Wind River's TINA TCP/IP offload engine with an Internet SCSI protocol layer, which, the company says, will give developers all necessary components to build the devices.

The tools combine its Envoy SNMP implementation with RapidControl, the company's previous device management offering, into a single development framework that can be used either alone or in concert with its Tornado integrated development environment. The tools will reportedly permit developers to create custom device management interfaces that employ SNMP, Web server, command line or any combination of the three. The WindManage SNMP agent is scheduled for release in July, with Web and command-line capabilities to follow by September.

Scheduled for release to beta this month is WindNet 802.1X, a port-based access control framework based on its namesake IEEE security protocol that Wind River says will let developers build and deploy devices and maintain control over which components have access to which services within those devices. 802.1X uses the Extensible Authentication Protocol (EAP) to pass messages to RADIUS authentication servers. According to the company, WindNet 802.1X will support wireless key distribution, dynamic key management and several EAP variations. Wind River did not reveal pricing for any of its forthcoming products. ■



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TECHNOLOGY

QNX

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ders said the bundles are organized to target two distinct groups of developers. Priced at \$4,295, the standard edition is designed for developers and VARs targeting standard hardware, Saunders said, and includes one reference design for each supported processor platform. The \$8,695 professional edition, he said, is intended "for OEMs and enterprise developers that might be working on proprietary board designs and larger projects," and includes 17 board support packages targeting 25 boards and a plug-in for integration with Rational's ClearCase version control software. ■

PalmSource Preps for Palm OS 5

Improved compliance program targets software's future compatibility

BY EDWARD J. CORREIA

PalmSource Inc., the software subsidiary of Palm Inc., has unveiled a version of its compliance program for Palm OS 5, the company's forthcoming update to its handheld operating system that will include among other enhancements support for ARM processors. The testing program will coincide with the release of Palm OS 5, scheduled for this summer.



Switching processors is a big deal, says PalmSource's Mace.

According to Michael Mace, chief competitive officer at PalmSource, the compliance program is designed to assist developers with what could be a complicated task. "Switching processors is a big deal, and we want to provide a smooth and seamless transition. Every time you [release] a new version of an OS, there are always things that get changed and apps that need to be revamped." To date, Palm OS had supported only Motorola's Dragonball 68K processor.

Mace said that with a few exceptions, applications that ran under Palm OS 4 will run unchanged on new ARM-based devices running Palm OS 5 thanks to PACE, the Palm Application Compatibility Environment, which translates instructions for applications running on current Dragonball-based devices to those for ARM.

Mace further claimed that the switch will require little effort from developers. "They don't have to go out and buy an ARM system or march to anything. The old stuff will continue to run," except where developers have circumvented Palm's recommended programming techniques. "The tests are checking for proper use of the Palm OS 4 APIs. A number of Palm OS developers have done hacks and worked around pieces of the operating system. Some of those hacks won't work because the hardware has been changed."

Conducting the certifica-

tion testing will be Product Quality Partners Inc. (www.qppqa.com); certified applications earn the right to display a compatibility logo. Accord-

ing to Quality Partners, the new test, dubbed the Palm Powered Compatible Solutions Test, will put more emphasis on compatibility

with future versions of the operating system than the previous Designed for Palm Computing Platform Platinum test did. The new tests also will

support Palm's m500 series devices, and test new features in Palm OS 4.0, including compatibility with several types of expansion cards. Developers may download a free readiness kit, which includes a Palm OS 5 simulator, at www.palmsource.com. It is available now. ■



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Enterprise XML: The Real Missing Link

Real-world applications use data format as the new EDI

BY MITCH WAGNER

Enterprises are using XML and the Internet as the string to tie their internal systems to the systems of business partners.

XML provides a data interchange format analogous to Electronic Data Interchange (EDI), but offers greater flexibility and ease of programming than proprietary data formats, with support from a broad range of tools and vendors. Indeed, XML is replacing proprietary data formats such as EDI in a manner similar to the way in which standard Internet protocols such as TCP/IP, HTTP and HTML replaced proprietary protocols for networking and content display.

"XML is about data interchange," said Mark Resh, CIO of iGetSmart.com. "It's the next version of EDI. But while EDI is really a batch system, XML is real time."

iGetSmart manages the distribution of printed products and supplies for its customers in the graphic arts industry. As part of that service, the company provides supply chain management software. Two years ago, the company began using XML to build "punchouts" into that software. Punchouts enable customers to click on a link in the supply chain management software's browser interface, which connects to a supplier who might be using a different software package from a company such as Arriba,

CommerceOne or PurchasePro.

The chief advantage for iGetSmart is that XML is supported by many partner software packages, and is transport-independent, said Resh. Using the system, customers would buy the supplier's products using the third-party software, and that software would then export its shopping cart results to the iGetSmart software, all without the end user knowing that he or she has gone from one software package to another and back.

"It's standardized," said Dave Winer, chairman and CEO of Userland Software Inc. (www.userland.com), which makes XML-based content creation, management and sharing tools. "Instead of each vendor having to come up with their own format all the way down to how you manage the basic units of information, we agree we will follow the XML specification."

Terra Lycos (www.terralycos.com), which operates a number of well-known Web portals in English, Spanish and Portuguese-speaking markets, has been using XML for about three years to aggregate content from multiple partners into individual portal pages for its end users, said chief architect Vince Russo. Some partners can provide Terra Lycos with a feed of information, either in a proprietary format or using XML, and Terra Lycos will

display the information on its own pages. Other partners don't provide a feed; in those cases, Terra Lycos will spider through the partner's Web site to get important information.

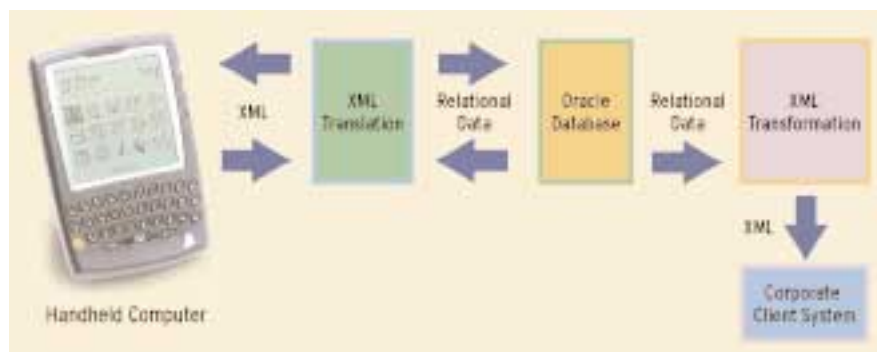
"It's more open when compared with a binary protocol in the sense that it's easier to connect together logic tiers. It's not vendor-specific. It's text-based, so you can produce it with a lot of tools—a Perl script can do it, as can other standard scripting languages, as can C, C++ or Java. Or anything. It's language-neutral," Russo said.

XML's flexibility allows enterprises to customize data formats for individual needs. For instance, hotel management company Carlson Companies Inc. (www.carlson.com) uses XML to link the Web sites for its hotels, which include Radisson Hotels and Resorts, Country Inns & Suites by Carlson, and Park Plaza and Park Inn hotels, to Carlson's internal room-reservation system, called Curtis-C. The reservation system was built using Sun Microsystems Inc.'s Forte tools suite, now called Sun ONE Studio. XML provides the flexibility to make it easier to allow consumers to specify rooms by price, smoking or nonsmoking, king-size beds and other criteria. "The XML interface we have with our branded Web sites offers a better selling process," said Steve Medina, system architect for Curtis-C systems and the main hotel reservation system at Carlson.

Another company, Burlington Coat Factory (www.burlingtoncoat.com), plans to use XML to extend a new, Linux-based point-of-sale system that it is rolling out in its stores this year. "A lot of the payback will be the ease of accommodating additional functionality and additional point-of-sale peripherals as they evolve," said Burlington Coat Factory CIO Mike Prince. "Point-of-sale is constantly evolving, and one of the things we were running against is that we had these old DOS-based 286 and 386 [cash] registers and it was getting harder and harder to cram functionality in." Burlington's new point-of-sale software from 360Commerce will be extensible to cover new technologies such as stored-value gift cards. Because the 360Commerce system uses standard XML interfaces, it will likely be able to connect to future technologies that have not yet been developed, but which will likely use standard XML when they do come out.

Also, XML allows programmers to add new data types simply by creating new tags, without having to go back and retrofit existing systems to accommodate the new tags, Prince said.

AutoVIN (www.autovin.com), a company that provides car inspection services for corporate clients, found similar virtues in XML extensibility. Its handheld computing-based vehicle inspection system uses XML to interface with a



AutoVIN uses XML interfaces to expedite collecting auto inspection data for corporate clients.





DOT-COMS PUT LANGUAGE IN PLAY

Two major pure-play dot-coms, Amazon.com Inc. and Google Inc., recently announced programs to open their infrastructure to partners en masse using XML over the Internet.

Amazon launched a program to use XML to export catalog data to any of its 700,000 associates who care to participate. And Google launched interfaces to use XML to run Web searches.

Amazon (www.amazon.com) selected XML because it's widely adopted, said Charlie Bell, the online store's vice president of technology infrastructure. "One of the things you see over history is that the stuff that works isn't the grand, planned complicated architecture backed by a particular vendor or large vendors. It's the viral stuff that happens quickly and gets adopted," he said. Amazon also uses XML to communicate with suppliers and sellers that use Amazon

pages to peddle their own wares.

The XML for associates uses standard SOAP and WSDL interfaces. Amazon provides an associate with a URL, which, when invoked, returns an XML document containing catalog information that the associate can then format to match the look of his site. When a customer wants to make a purchase, he or she goes directly to Amazon.com using a link that identifies the associate to Amazon so the associate is credited for the sale, said Amazon CTO Alan Vermeulen.

Google (www.google.com) implemented a SOAP-faced API that performs a search and returns the top 10 results with URLs and descriptions, along with the total number of results and other data. Other APIs retrieve cached pages and return spelling corrections on text entered by a user, said Nelson Minar, a

software engineer for Google.

The program is now in beta, with no charge to use the service and limitations that the service must be used for personal use only, and for no more than 1,000 searches per day. Google will commercialize the program if there is sufficient interest, Minar said. Possible applications include using Google for market research, plugging the Google spell-checker into other applications, or for companies to research what users are saying about them on the Web. Developers also could build add-ons for office applications that automatically generate Google searches on selected words. The program is implemented using Apache SOAP.

So far, developers have implemented the API to build "Google boxes" on Web pages, to return the latest results on a given search, and to perform Google searches over e-mail and from America Online's instant messages.

—Mitch Wagner

"You can't expect a partner to reinvent the wheel to transact business with you. Although in the long term, XML will displace a lot of the standard EDI stuff that goes on."

XML OVER CARRIER PIGEON?

Much of the most recent hype surrounding XML is about Web services. The difference between Web services and other XML technologies that use the Internet is slight. Indeed, the very definition of Web services varies depending on who is using the phrase. Virtually everyone understands the phrase to mean XML over HTTP used to connect applications to other applications (just as the Web itself used HTML over HTTP to connect people with applications). But some companies put a twist on it.

Microsoft Corp., for instance, says that Web services require the use of SOAP, the Simple Object Access Protocol; this is not surprising because Microsoft is a major proponent of SOAP. The Sun definition of Web services doesn't mention the protocol—the list of technologies for its Java Web Services Developer Pack doesn't include SOAP—but it does mention Java and J2EE as technologies that are often used in Web services. Indeed, from the developer's perspective, SOAP is sometimes considered optional.

Userland's Winer said that XML plus HTTP equals Web services, but added that the protocol underlying the XML doesn't have to be HTTP for the format to be useful. "I don't care what it's coming over. I don't care if it's going over carrier pigeon," he said.

Indeed, many companies are not running XML over HTTP, but instead are using other protocols. Monster.com, for instance, uses FTP and e-mail to exchange XML documents with business partners. The job board eschews HTTP because HTTP is largely a syn-

chronous protocol, and much of the data exchange with business partners needs to be done asynchronously, said architect Greg Olejarz. "You can't make an assumption that every application will be available at all times."

Likewise, AutoVIN uses e-mail and FTP to transmit files to business partners, although AutoVIN is encouraging partners to move to exchanging the data using HTTP. HTTP uses less system

overhead; you don't need to create a file, store a file, then process it. HTTP can be more closely integrated with the database; creating and sending the file is a single step. "My philosophy is to have as few moving parts as possible," AutoVIN's Dillow said.

While XML is being used to transmit data between partners, most companies are not using XML as a native format

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XML Fragmentation: Real or Imagined?

BY MITCH WAGNER

Proprietary extensions are a constant risk in any technology designed to promote interoperability among multiple vendors, and XML is no exception.

"All XML really is, is a syntax. XML is just what the words look like; you still have to construct sentences," said Vince Russo, chief architect for Terra Lycos.

Mark Resh, CIO of iGetSmart.com, agreed. "Just like with EDI, everybody tends to mess with the standard. You get a lot of weird stuff that comes through," he said.

Low-level standards such as SOAP and WSDL are well established, but high-level standards for coordinating and orchestrating business processes are still in dispute, said Greg Olejarz, architect for Monster.com. Microsoft is proposing XLANG for coordinating business processes, while IBM is backing the Web Services Flow Language (WSFL). Enterprises need to evaluate products to be sure they adhere to interoperability standards.

Both Microsoft and Sun would like to lock enterprises into proprietary standards and tools. But because XML is not a binary standard, it's almost trivial to

reverse-engineer a vendor's standard—you just look at the code, Russo said.

Customer pressure will keep vendors in line. One of the main reasons to implement XML is to achieve interoperability among multiple vendors' systems; vendors that implement proprietary XML will find a lack of customers, said Chris Dillow, IT director for AutoVIN.

A key existing standard for XML is SOAP, the Simple Object Access Protocol, for sending messages over the Web. Others include XML Schema, a standard for defining content; the Web Services Definition Language (WSDL), which allows documents to describe their own interfaces; and the Extensible Stylesheet Language Transformation (XSLT), for converting XML documents into other XML formats, or into other formats such as PDF or HTML.

And vertical industries and vertical business functions are combining to define XML standards for terms and transactions specific to their own sector. RosettaNet is a consortium of electronics and information technology companies setting up a sweeping set of XML stan-

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central Oracle data store, which in turn connects via XML to AutoVIN's corporate customers.

The company's first-generation system was difficult to extend, with a fixed-width binary file format. Moreover, the first-generation system was bandwidth-intensive. "If you had a character field that was 2,000 characters, even if you used one character of that field it still took 2,000 bytes. Each file averaged 100K. It took a long time to transmit using a modem, which is the primary way of access in the field," said Chris Dillow, director of IT for AutoVIN.

And because XML is generally human-readable, it's easier to debug, added Dillow: "If you have a problem with a file, you can just look at it in the browser and fix it."

XML often coexists in shops with other data formats. Much of the booking at Carlson hotels still comes in from Global Distribution Systems such as Sabre and Pegasus, which use proprietary data formats. "There's a place for both," Medina said.

Likewise, Carlson chose not to use XML to connect with a vendor who manages several hundred of the Carlson hotels. The vendor connects over a low-bandwidth wide-area network connection, and XML would have been too bandwidth-intensive, Medina said. The company instead uses its own proprietary data format running over TCP/IP.

Companies like Burlington Coat Factory have long-standing EDI links with suppliers that are working well and will not be changed. "You don't change relationships just because there's new technology," Prince said.

ENTERPRISE XML

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for their data repositories. They are storing data in the traditional rows and columns of relational databases rather than in XML databases.

"Relational databases have been around for 20 years, they

scale very well, they have got great failover characteristics, they have great transaction technology, they have queuing systems—and so on, and so on and so on," said Amazon.com CTO Alan Vermeulen. The company uses XML interfaces to connect with suppliers, partners who sell their own mer-

chandise on the Amazon Web site, and major big-box companies such as Borders and Toys 'R' Us who help with co-branded sites and affiliates.

AutoVIN uses an Oracle database, with transformation tools from DataMirror used to convert data from relational format to XML. "Oracle is very

good at giving you XML data out of a database. But when you want to put data into a database using XML, that's where it breaks down," Dillow said, adding that it's also been a problem he's experienced with Microsoft's SQL Server.

But regardless of the choice of underlying technology, such

as a specific relational database, transport layer or even access protocol like SOAP, the reality is that XML is more than hype, and more than one of the core standards found within Web services. For integration within the enterprise, as well as outreach to partners and customers, XML is just like EDI—only better. ■

FRAGMENTATION

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dards for that industry. Monster.com is active in the HR-XML Consortium, which is defining interfaces for the human resources business functions. The Open Travel Alliance is working on XML standards for the travel industry, and the Association for Retail Technology Standards is working on its own XML standards.

Of course, APIs are one kind of standard. Packaged software from Oracle, Microsoft and other major vendors is another.

Enterprises are using a mix of packaged software and homegrown tools to build and run their XML applications. For the current generation of companies with mature XML applications, off-the-shelf software often didn't exist to do what was needed when they were building their applications. "That was at the beginning of XML; there weren't a lot of things available," said Resh, who helped write iGet-Smart.com's XML processing system, using some open-source tools.

Monster.com, which is a Microsoft shop, evaluated Microsoft's BizTalk product but decided not to use it. At the time, it did not support connectivity to SAP and PeopleSoft, although the software does now, Olejarz said.

Most packaged tools are still focused on simple one-step interaction, such as a stock lookup, rather than complex multistage interactions, he said.

The flip side of the lack of specialized XML tools is that XML's simple format makes it easy for users to create their own XML tools. An ordinary HTML parser can parse XML. That's very unlike CORBA, a previous attempt to define a standard for application-to-application communication over a network, which required a great deal of specialized software and infrastructure, Terra Lycos' Russo said. ■

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Application integration is an intimidating challenge for any enterprise; the downtime costs of unreliable integration are unthinkable expensive. To keep profits climbing, enterprises are adopting open standards-based messaging, caching and integration solutions.

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EDITORIALS

XML: Not Only for Web Services

To listen to all the vendor hyperbole, you'd think that "XML" has become merely a three-letter acronym that goes in front of "Web services." Of course, the Extensible Markup Language is one of the trinity of fundamental standards that embrace most common definitions of Web services, the others being SOAP and WSDL. (Two other closely related specifications are HTTP and UDDI.)

While XML's use in Web services—that is, standards-based programmatic access to remote server applications—is the latest of its myriad applications, one might argue that it's not even the most important for mainstream software development. Despite the emphasis that tools and platform vendors are placing on unproven corporate adoption of Web services, XML's well-established use as a platform-independent data and metadata format should not be neglected.

Indeed, to many early XML adopters, the specification's appeal was as a replacement for Electronic Data Interchange, providing a simple, inexpensive means for different vendors to share information with their partners and suppliers without the traditional complexities that EDI imposed on all participants. Industry experience has shown that as an alternative to proprietary data formats, well-formed XML documents with rigorous schemas can prove to be flexible and accessible, providing structure while allowing a particular industry's XML vocabulary to easily evolve where needed.

XML's standardization efforts aren't yet completed, as companies such as IBM and Microsoft are pursuing their own extensions to XML designed for nontraditional metadata content, such as the definitions of business processes and document workflow. Clearly, XML still has miles to go, but along the way, let's not lose our focus on XML's primary and proven use: to exchange data.

Heart of the Matter

It's bad enough when applications run just fine on the development workstation but crash on the test bed or during beta tests. It's worse when the app works in the lab or during testing, but inexplicably fails when deployed on production servers or workstations. That's a problem that's plagued software developers and QA specialists since time immemorial, but with today's increasingly distributed applications, it's becoming ever harder to thoroughly test applications in a clean-room environment.

Why? Too many of the components may be external and beyond the scope of the testing—such as databases, middleware systems or host minicomputers or mainframes. In other cases, the transaction volume may overwhelm a server or point out weaknesses in non-optimized code, or flawed app servers or runtime environments might accumulate memory leaks that aren't apparent in the QA lab. This situation is exacerbated when the application is deployed on multiple servers, such as for field offices or at customer locations.

For such applications, the only solution may be in a new category of tools, which run alongside the application in the production environment, watching and logging all transactions in the hope of capturing sufficient information to trace the fault to its origin. These so-called "root-cause analysis" utilities are not cheap but may be the right tool for the job. ■

GUEST VIEW

DESIGNING FOR A BROWSER

Software developers are facing a number of new challenges as the marketplace continues to shift and evolve.

Reduced spending, increased competition, nontraditional work environments and ongoing technological advances impose new pressures to adapt software offerings accordingly. Forward-thinking developers are increasingly moving from traditional Windows-based offerings to browser-based interfaces to keep pace.

Browsers help companies provide online access to their internal applications, and today's work force is becoming more and more comfortable in that environment. The challenge is that unlike Windows-based applications, there are no graphical interface standards such as formatting, icons and fonts that can be used by all developers. This forces companies to design unique user interfaces that meet their individual needs and identity.

Sure, from a marketing standpoint this customized appearance is a good thing, and helps to differentiate the application from competitors and even allows companies to build a brand around the look and feel of their product or product family. But from the

engineering and product management view, this requires new skills—information and visual design—which are not traditionally found in a development team. The result is that these resources need to come from outside the core development group, and possibly even outside the organization, and in many instances the latter makes the most business sense.

As hundreds or even thousands of software products are migrating to browser-based solutions, there are a few key areas in which you can stay ahead of the competition:

Usability. The user experience is vital to the success of any software application. If users are not comfortable with the interface, expensive training, misuse and downtime can negatively impact the return on a company's investment in your software.

A good user interface design starts with the user in mind—who they are, what they need to do, how they will interact with the software, how often they will use it, etc. By considering these factors before you begin design, you can develop a highly usable interface.

Different types of users

have different needs and expectations. Demographics such as age, gender and nationality, along with the user's experience level and the environment in which the software will be used, should all be taken into careful consideration. Technical users are familiar with traditional software and expect certain conventions to be present and need limited assistance. For the technical user, lengthy instructional text or nonfunctional design elements can inhibit their interactions and cause negative impressions.

On the other hand, less-savvy users feel more comfortable with frequent prompts regarding what to do and how to do it, and can be intrigued by fancy graphics.

Certainly, what will appeal to an 18-year-old male is different from what will appeal to a 40-year-old female. If you are trying to appeal to a niche market, researching trends and other products geared to that demographic will provide valuable insights. If you are targeting a broader audience, following general usability best practices and conventional design style may be your safest bet.

Even with exhaustive upfront planning and research, you can never be sure your new interface will hit the mark



ERIC DODIER

ORACLE COMES OUT SWINGING

May was a rough month for Oracle Corp. First, the company was pilloried in the West Coast media for alleged hanky-panky regarding a large-volume software license agreement signed by the state of California, and then Gartner Inc. released data showing that IBM Corp. has surpassed Oracle's database market share, and that IBM's sales are increasing while Oracle's are declining.

The second item is arguably the more painful. According to Gartner figures released on May 6, IBM's new license sales of all database software was top of the heap, at \$3.064 billion—that is, a 34.6 percent market share. Oracle came in second, at 32.0 percent, followed by Microsoft Corp. at

16.3 percent, and Sybase Inc. at 2.6 percent. Other companies' database products totaled 14.4 percent of sales in 2001, according to the study.

However, IBM's figure incorporated license revenue from its purchase of Informix earlier in 2001. Without that, according to Gartner, IBM's database sales would have been in the No. 2 spot, at 31.7 percent.

The Gartner report also showed IBM's database sales grew by 4.3 percent in 2000 and 2001—broken out as 5.7 percent growth for its existing businesses, and a 9.4 percent decline for the Informix business. Oracle, on the other hand,

declined 4.9 percent year-on-year, while Microsoft increased its database sales by 17.8 percent and Sybase dropped by 16.1 percent.

Oracle immediately cried foul on the numbers—not by challenging the inclusion of

Informix, or even the numbers themselves, but by asserting that Gartner's numbers focused too heavily on all database technologies, "which includes databases on legacy systems, instead of the modern relational mar-

ket," according to a statement by Oracle CFO Jeff Henley. "Oracle is challenging that the significance placed on the overall database numbers—which include databases sold on legacy systems—when in fact the significance should be



ALAN WATCH

ALAN ZEICHICK

perfectly. But, performing structured usability tests with individuals from a cross-section of your target audience can help ensure you are moving in the right direction.

Usability tests can range from task-based observations to general surveys on what appeals to the user or seems confusing about the design or flow of the interface. Tests performed at critical milestones in the design process can provide valuable insight and allow modifications to be made more cost effectively than would be possible after development has been completed.

Compatibility. Traditional software is created for a specific operating system—Windows, Mac OS, Linux and so on. Migrating to a browser-based world doesn't eliminate that problem. There are countless browser types and versions, not to mention the combinations of browsers with operating systems. Internet Explorer 5.0 on a Windows 98 PC is one target platform, and Netscape 6.0 on an iMac is a very different platform. True, you can restrict the combinations they are optimizing their browser-based software for, but limiting it too much can alienate users who have a strong affinity to their browser or computer type. Not supporting Netscape or the Macintosh is like forcing a Coke drinker to have a Pepsi.

It is safe to say that you can

accommodate a vast majority of your target audience without breaking the bank trying to be backward-compatible with the browsers of the early 1990s. A little research should help uncover the critical combinations your audience is most often using.

However, supporting even a limited number of environments still can be tricky, because a lot of code is read and displayed differently by different browser versions and types. Designing a user interface that will appear and function consistently across the selected environments requires intimate knowledge of the potential pitfalls of each and how they can be avoided.

Flexibility. The introduction of browser-based software has also brought about a variety of ways in which the software is being deployed. Many ASPs and portals are combining applications to offer a full-service solution, and larger customers are looking to rebrand the software to resell to their end users. How your software is likely to be deployed will play a large part in how the interface will be designed—both visually and functionally.

If the application will be combined and packaged in an offering with others, it will need to be flexible enough to take on the desired appearance and screen space of the provider. Often this is as simple as swapping out logos and

colors. To accommodate these changes, visual designers can make use of HTML color codes rather than graphics and still achieve an appealing interface design. This increases the flexibility of the interface and also offers a second benefit of decreasing download speeds.

Of course, localization is another area that necessitates the modification of the core interface. Globally recognized icons or HTML text can be incorporated into the interface to simplify this process as well. A well-designed interface should be flexible enough to accommodate anticipated modifications with ease. A series of style guidelines and implementation documentation should be provided to the customer, assisting them with customization without compromising the integrity of the interface.

Marketability. In the business world, more often than not, the person making the decision to purchase your software will not be the one who will be using the application the most. The decision-makers typically control the purse strings and are looking for an application that meets the functionality requirements, but they also tend to gravitate to the applications that appear to be the most professional. A highly functional interface that lacks visual consistency or polish will often be perceived as being of lesser quality.

It is not uncommon that when your sales and marketing teams get the first glance at their new product release there is an unhappy closed-door session about how they are going to sell something that looks sloppy or unprofessional or less than state-of-the-art. After learning the hard way that such products are indeed difficult to sell, product managers are now building both visual and information design into the development schedule.

The core competencies of most internal software development teams do not include the visual and information design skills needed to successfully roll out browser-based applications. By tapping external resources versed in these skills, companies are able to streamline the design process and ensure a positive user experience for their customers. Incremental improvements can continue to be made to the interface as user feedback is received. Much like adding functionality when customers demand it, interface presentation can also be improved for future releases by analyzing user feedback and usage patterns.

It is never too early to start planning for your next release and how you are going to meet the increasingly demanding customer expectations. ■

Eric Dodier is co-founder and CEO of PixelMedia Inc.

placed on the modern database systems market, comprising UNIX, Linux and Windows NT," the statement continued.

And indeed, Gartner also released RDBMS numbers that showed Oracle in the top position with 39.8 percent market share, compared with IBM's aggregate 34.1 percent (30.7 percent for its pre-Informix products), Microsoft's 14.4 percent and Sybase's 3.3 percent. The results still show Oracle's sales declining by 4.9 percent from 2000, however, compared with IBM's RDBMS growth of 6.2 percent and Microsoft's RDBMS growth of 25.3 percent. Sybase's RDBMS sales declined 16.1 percent over that period.

Rather than addressing questions of why its sales are declining, Oracle also chose to play the "Enron card," casting

doubt on the numbers themselves: "In this time when financial reporting is under scrutiny, it is sadly ironic that the revenue and growth data provided to the industry analysts by the vendors themselves is not independently validated, outside of Oracle's. Until our major database competitors, IBM and Microsoft, provide audited database financial numbers, the data that makes up these analyst reports is suspect," insisted Henley. "Oracle is challenging IBM and Microsoft to provide the industry analyst firms with audited numbers so that a fair and accurate comparison can be made." At least Henley didn't try to blame butterfly ballots or demand a recount.

Still, take-no-prisoners challenges seem to be the order of the day at Oracle, which is

embroiled in a scandal involving a no-bid \$95 million volume license agreement with the state of California, including a reported larger number of per-seat software licenses than the state actually requires. This hastily written contract appears to have coincided with a \$25,000 campaign donation to Gov. Gray Davis and a \$50,000 donation to state Attorney General Bill Lockyer. While state officials scrambled to save their reputations and reverse the deal, Davis and Lockyer both returned Oracle's contribution.

Oracle's Henley defended the licensing agreement in another public statement, saying, "Oracle continues to believe that the contract delivers great value to the state and local governments in California." In response to the cam-

paign-donation issue, Henley simply released a list of other big corporate donors to Davis, along with the statement: "We would like to point out that there was nothing out of the ordinary about it." Boy, that's a strong defense.

There's no doubt that these are tough times for Oracle, and when the going gets tough, the tough keep fighting. But with a stock price selling at more than 50 percent off of its 12-month high, and at only a fraction of its peak in mid-2000, the company has to do more than issue statements from its CFO. It needs to reverse its skidding software sales, and not just by working questionable deals with the state of California. ■

Alan Zeichick is editor-in-chief of SD Times.

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Publisher

Ted Bahr

516-922-2101 x101 • ted@bzmedia.com

Editor-in-Chief

Alan Zeichick

650-359-4763 • alan@bzmedia.com

Executive Editor

David Rubinstein

516-922-2101 x105 • drubinstein@bzmedia.com

Senior News Editor

Edward J. Correia

516-922-2101 x100 • ecorreia@bzmedia.com

Assistant News Editor

Christina M. Purpi

516-922-2101 x111 • cpurpi@bzmedia.com

Copy Chief

Patricia Sarica

516-922-2101 x106 • psarica@bzmedia.com

Art Director

Mara Leonardi

516-922-2101 x109 • mleonardi@bzmedia.com

Columnists

Andrew Binstock

abinstock@pacificdataworks.com

Wayne Rash

wrash@mindspring.com

Oliver Rist

orist@mindspring.com

Steven J. Vaughan-Nichols

sjohn@cna1.com

Contributing Writers

Alyson Behr

alyson@behrcomm.com

Jennifer deJong

jdejong@vermontel.net

Lisa Morgan

lisamorgan@mindspring.com

Advertising Sales Representatives

Southwest U.S.

Julie Fountain

831-476-1716 • jfountain@bzmedia.com

Northeast/North Central U.S./Canada

David Karp

516-922-5253 • dkarp@bzmedia.com

Northwest U.S./Canada

Paula F. Miller

925-831-3803 • pmiller@bzmedia.com

Southeast U.S./Europe

Jonathan Sawyer

603-924-4489 • jsawyer@bzmedia.com

Director of Circulation & Manufacturing

Rebecca Pappas

516-922-1818 • rpappas@bzmedia.com

Circulation Assistant

Phyllis Oakes

516-922-2287 • poakes@bzmedia.com

Office Manager/Marketing

Cathy Zimmermann

516-922-2101 x108 • czimmermann@bzmedia.com

Customer Service/Subscriptions

866-254-0110 • service@bzmedia.com

Bookkeeping Services

Ken Hafner • Kiwi Partners Inc.

khafner@kiwipartners.com

Article Reprints

Reprint Management Services

Renee Wywadis

717-399-1900 x172 • rwywadis@rmsreprints.com



BZ Media

BZ Media LLC

2 East Main Street

Oyster Bay, NY 11771

516-922-2101 • fax 516-922-1822

www.bzmedia.com • info@bzmedia.com

President

Ted Bahr

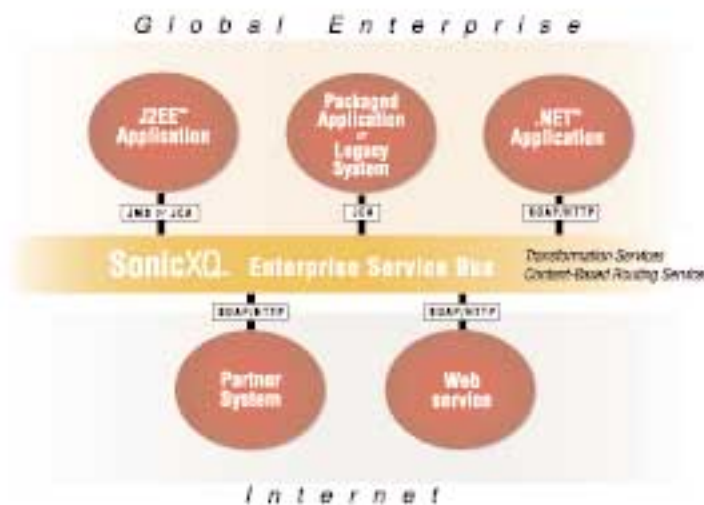
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BEARISH ON SUN

A series of generally disappointing moves was announced by Sun Microsystems Inc. in late April. The changes involved software strategy and departures of key personnel. I'll get into them in a moment, but first I want to discuss Sun's overall situation.

You recall that Sun emerged years ago as a high-powered workstation vendor (which is why its Nasdaq symbol is still SUNW). It successfully maintained a ferocious competition in the workstation market against Hewlett-Packard, IBM and Silicon Graphics (SGI). However, the arrival of high-powered, dual-processing Intel workstations and reliable-enough operating systems from Microsoft flushed Sun and most of the other Unix vendors from the workstation market.

SGI's fate, in particular, was telling. The company's products were the cream of the workstation offerings and inspired a cultlike devotion in customers, especially in the media and graphics industries. As Intel and Sun eroded the bottom of the workstation market out from under SGI, they chased the vendor up to the very highest point of the pyramid. Once there, SGI had no place to go. Everyone who

wanted an SGI workstation had one. And many who had them began to upgrade to less-expensive boxes from Intel and Sun. SGI suffered a terrible fall from which it never recovered.

At this juncture, Sun moved into servers while keeping a hand in the workstation market. The core focus, however, was the big boxes. Here the competition was much larger business units at HP and IBM. Despite such opposition, Sun made considerable headway in the server market due to timing: The Internet bubble was forming, Sun jumped on it, and Sun's competitors were slow to respond. As a result, Sun's marketing could claim it was the inspiration for the Web and the Internet with such slogans as "We put the dot in dot-com," whose exact meaning is still unclear to me years later. In addition, Sun rode the wave of Java—a wonderful product that powered much of the software development of the last few years. As a result, Sun rose and fell in perfect synchronization with the Internet bubble. And so the question now is: How does Sun rise again?

Sun's current server story rides on

two rails: Internet servers and database servers running Oracle. All else is noise. To speak of, Sun makes no money selling software (tools, operating systems, Java contribute next to nothing). Early in the downturn, Sun miscalculated by touting servers with 100+ processors and mainframe-like features such as application partitioning. This move fared poorly. Companies in a recession were not about to buy big iron. And certainly if they were, it would be IBM's, not Sun's.

IBM's long history of reliability in mainframes and its incomparable reputation for service mean that Sun could not then and will not in the future be able to make headway at the high end of the market.

Sun then refocused on the middle tier, where it fights with HP and, again, IBM—two very competent, well-liked competitors. For Sun to get business here beyond what it will naturally pick up from the HP merger mess, it will need to define some added value. This will be hard. Sun's reputation in this market is not good. Its past cockiness is part of the problem, as is a bungled response to serious memory problems on its servers last year.

Meanwhile at the low end, Sun tried to hold off Intel by rolling out a low-end

line of Linux appliances. It must roil Sun terribly to sell Intel boxes. Moreover, competing with Dell, Compaq/HP and again IBM by selling PCs with non-Sun processors and non-Sun Unix is just not going to be a strategy Sun will put its heart into. The move is purely defensive.

Earlier this year, Sun announced a new initiative: enterprise storage. It competes with IBM (the theme here is hard to ignore) and two other well-entrenched competitors: EMC and Hitachi. I trust I need not explain my views on its prospects in storage.

In sum, the market's high end is held in a death grip by IBM. The low end is being devoured by Intel vendors. The middle tier where Sun is now jammed is occupied by larger rivals (HP and IBM) that are more conversant with the IT audience.

And, then, the final week of April saw the resignation of the company's COO, Ed Zander, and its CFO, Michael Lehman. It also saw the stock's price drop to a four-year low.

Sun's market predicament and lack of coherent hardware strategy require a distinctly pessimistic assessment. But what about its software strategy? We'll examine that in the next issue. ■

Andrew Binstock is the principal analyst at Pacific Data Works LLC.

MIDDLEWARE WATCH



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Meet the Java Developer's Boss

It's the classic midsize enterprise shop: mainframes, minicomputers, Unix and Windows, databases, Web servers. The only new technology is Java. Three years ago, his programmers were experimenting with Java as a cross-platform rapid prototyping language. Today, Java 2 Enterprise Edition has become the company's standard platform for new projects.

That doesn't mean that he's blindly trusting Sun or the Java Community Process. There are a lot of questions surrounding messaging services and the update cycle for the Enterprise JavaBeans specification. And he's not happy with the fact that Sun uses its iPlanet alliance to compete against third-party application server developers like BEA and IBM, because that creates an inherent conflict of interest. It's hard to predict what Sun will do next. Still, the broad industry support behind J2EE has convinced him that the technology is his company's best bet. For now.

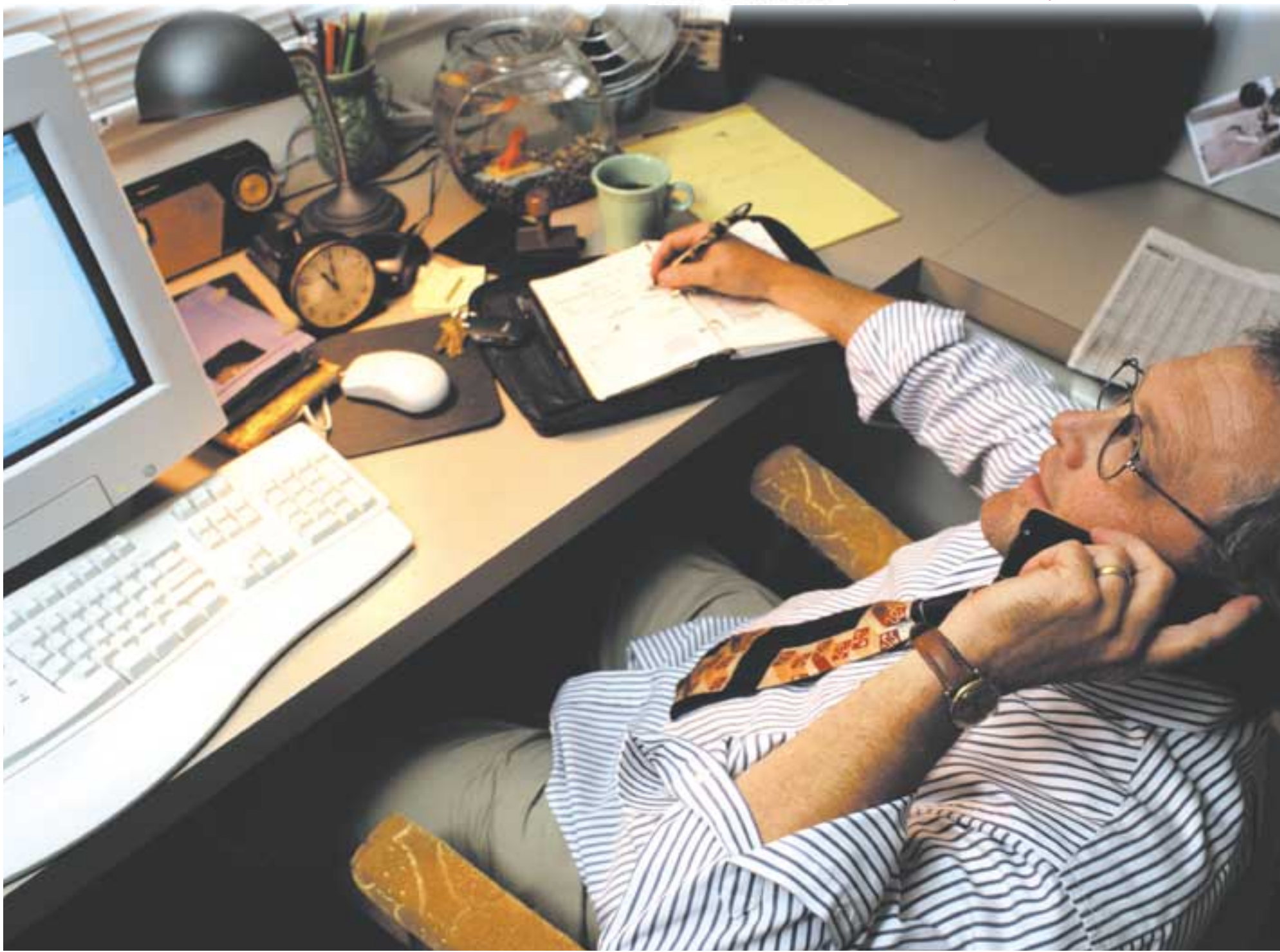
His biggest problem is the rapid change of Java-related specifications. New technologies, new approval requirements, compatibility claims — they're flying fast and furiously. That's why the most important part of his job is carefully evaluating and then standardizing on best-of-breed products, partners, and suppliers. There's no way he'll let individual programmers make that type of decision.

The Java publications? Forget those. He doesn't need reams of source code or tips for choosing the right API calls. He needs a wide-angle view of the entire spectrum of enterprise software development, and a rational, balanced outlook on future Java developments. He needs to know the trends, the products, the alliances, the NEWS, and what it all means. That's why he reads SD Times.

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HOW NOT TO USE JAVA

Steven's the name, and giving informed opinions about using technology to fix problems is the game. I was staring out my office window and wondering if 11 a.m. was too early for lunch, when the phone rang.

"Steven J. Vaughan-Nichols speaking," I said. My corporate roots ran deep, and I would no more be flippant in answering a phone than I would use C# to build a DBMS.

"Hello," the sultry voice on the other end said. "I'm a software manager for Idonthaveaclue. We're systems integrators, and I've got some really big problems with Java. I was hoping you could help."

"Maybe I can, maybe I can't," I replied. "But it's your nickel, so speak your piece and then I'll tell you what I think."

"Our customer came to us and said that he needed this enterprise database program in three months and that it had to be written in Java. So, we said yes."

"Not much time," I commented. "Did they have the specs already worked out?"

"Ah, no," she replied. "But we needed the work, and we figured we'd get more time once the project was under way."

I closed my eyes—such is the way that many projects and the companies behind them crash and burn.

"Anyway," she continued, "we'd done some Java work a few years ago..."

"You do have someone who's programmed with J2EE 1.3 before, right?"

"Ah, no," she replied. "We figured we could pick that up as we go along. I mean it's just Java, right?"

"Listen, sweetcakes, we're a long way from the days of AWT for the interface and standard TCP/IP sockets for network programming. Today, you need to know the J2EE APIs, EJB and JDBC just for starters."

"There's no reason to get snotty!" she snarled. "We figured that out. Our programmers have all the O'Reilly books now, and they're picking it up quickly."

Well, sure a wizard programmer can do that, but for every developer who can speed-read his way through Java Web Services Developer Pack's docs tonight and program tomorrow, there are a dozen who sleep with a well-thumbed Visual Basic manual.

"So, how's it going then?" I asked.

"Uh, slowly. We were wondering if you knew any shortcuts in getting JNDI [Java Naming and Directory Interface] to work with Active Directory."

I counted to 10 in my head. Make that 20. "OK, you can do it, but why Active Directory? It would be much easier to use an LDAP server, particularly when you're already on a tight

deadline. Did the customer insist?"

"Well, no. We use Windows 2000 Server in-house, so we convinced them to switch over from an NT domain system with Linux and Samba servers to Win2K and Active Directory."

"I see," I said. Out of morbid curiosity I couldn't resist asking, "And, how is the AD migration going?"

"You know, it's funny you mention that, but their network administrators aren't coming to the planning meetings anymore. They said something about not feeling very well right now."

Sighing, I went on. "Is there anything I can help you with?"

"We're really running late; do you know any good Java programmers we could hire?"

Click.

Just a silly story? I wish.

Let's start from the top.

Don't accept insane deadlines. The days are gone when customers will accept overcharges for projects that aren't delivered on time. I can't believe I have to say this, but I've gotten two calls that boiled down to developers accepting completely unreasonable deadlines, so I guess I must.

Next, unless you've got programming gurus on staff, don't accept jobs that are beyond your skill sets and levels. And unless you're a pure Windows shop, if you haven't been keeping current with Java, get on the stick! If you expect to do

the new and creative work that your customers will be demanding, you and your staff must keep learning.

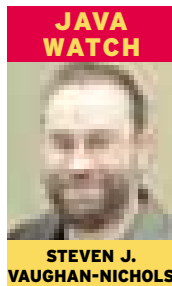
You should also have at least a passing familiarity with technologies like JNDI that maybe you haven't had to use that often. At the very least, you should know its strong points and weaknesses. Then, come the day you are called on to use directories, which is only going to happen more and more often, you'll know that JNDI works best with LDAP.

Next, don't ask the company to change its infrastructure for you. You're working for the company, not the other way around. But say you do get the change you want. It will guarantee that, at the very least, some IT staffers at the customer site aren't going to like you. And, when you ask for a dumb change, I guarantee that there will be network administrators out for your scalp.

Last, but not least, never forget the fundamental lesson of Fred Brooks' "The Mythical Man-Month": Throwing more people at a project will only make it later.

So go out there now and build good programs by making sure you know not only your tools, but your people and scheduling as well. I really don't need any more phone calls. ■

Steven J. Vaughan-Nichols has been writing about technology for more than 15 years and also has worked as a programmer for NASA and the Dept. of Defense.



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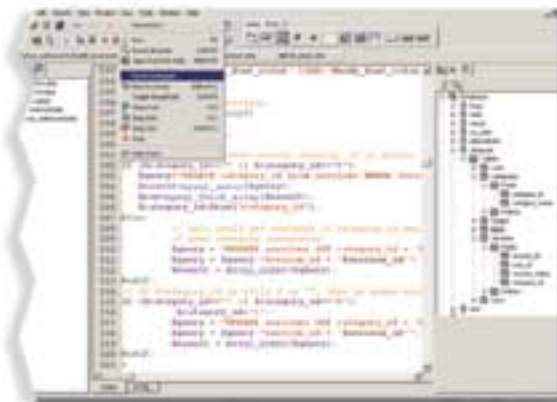
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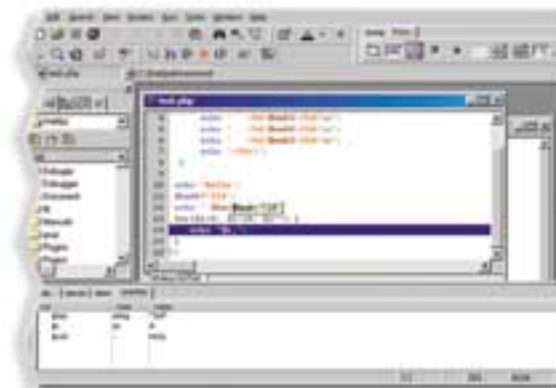
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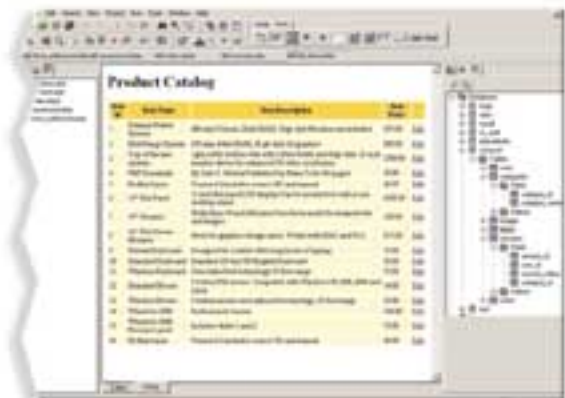
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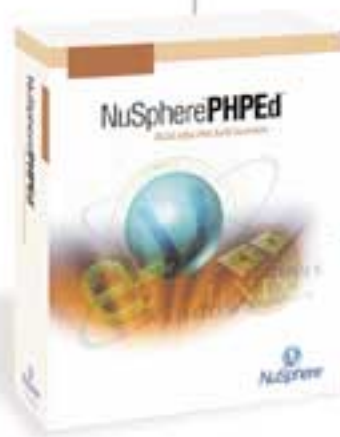
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THE SERVER AS WORKHORSE

Those of you who know me, also know that my home office is based in the gently rolling hills of the Virginia horse country. Yet on my farm you don't hear the soft sounds of contented four-legged animals grazing, and that's why we don't have to contend with the biological byproducts of that grazing. Instead, we keep the grass short and the property maintained using a cyborg-like mechanized alternative, affectionately referred to as "a teenager on a tractor."

Admittedly, the byproducts you're likely to step in when you visit your server farm aren't as odoriferous as those on a typical horse farm, but they're certainly more expensive and generally less useful. When you're doing unnecessary things in your server farm, you spend more money and generate heat. And there's not much you can do to recover value from either.

The problem is that your Web serving environment is probably doing a lot of things that it doesn't do well. Things that could be replaced with a more mechanized alternative. Kids on tractors won't help. XML and SSL are two things that immediately come to mind, but there are others.

For example, Web servers don't do SSL well at all. Adding the encryption soaks up processing power to such an extent that a 10-1 ratio isn't uncommon.

In other words, where you could once support 100 simultaneous HTML sessions on a server, the same server can support only 10 SSL sessions.

For this reason, many businesses that use SSL—and virtually all of those that have financial transactions or transactions that contain information related to privacy issues do—offload the SSL tasks to a separate server. But all that does is ensure that your Web server's performance doesn't suffer. You still have to run all those servers handling the SSL sessions, and you have to load balance them.

While the problem with XML isn't as bad, there's still a lot of processing power required when you use XML. Again, companies using XML in commerce usually offload those tasks, but they still end up buying a lot of servers, and load balancers, to make things work well. No matter how you look at it, this is not a good solution.

Sure, you need SSL or something like it. And you need XML if you're going to be involved in commerce on the Web. But throwing more servers at the problem isn't the right answer. You need an alternative, if only to keep you and your company from drowning in the byproducts.

Fortunately, alternatives exist. One

company that's hit the market with some impressive technology is Array Networks Inc. (www.arraynetworks.net), which has begun marketing an SSL accelerator designed for the Web services environment. In reality, the product, called the Array SP, does a lot more than just solve the SSL performance problem. It also secures Web services in general, including authentication, providing a hardened front end that handles most of the security issues that a company needs for its commerce sites. In addition, the SP can be clustered, so that you can have as many as 32 such appliances handling 800 sessions each. Think how many servers that would replace.

Array has said that it intends to provide support for SOAP in the near future, so that in addition to handling SSL acceleration and authentication, the device will handle intelligent content routing. With a device such as this, all your servers would have to do is serve up information, which is what they do best.

Array is not the only company in this field. Intel, for example, has provided both SSL acceleration appliances and XML acceleration appliances for more than a year. At one point, these devices were available directly from Intel; however, they're now sold through OEM arrangements, so it can be tough finding out where to get them. However, they do exist, and they are being made,

and XML acceleration is real. You just have to find it.

By now you're probably asking yourself why I'm writing about hardware in a software development newspaper. The reasons are simple. Why waste your time designing services that you can buy? And, why waste your time and resources designing around the limitations created by those services? Think how nice it would be if all you had to do was actually deliver the information your customers needed, rather than having to deal with the security problems of Web services, the performance hits that make it necessary to spread your work across vast numbers of servers, or the complexity of having to integrate everything from content routing and security with data delivery and database management in one big solution.

Whew. Just thinking about it makes me tired.

On the other hand, resources aren't getting any less scarce, the programmers of today aren't any smarter or faster, and your job isn't getting any easier. Maybe instead of designing your Web presence the old-fashioned way, it's time to do something about the alternative. Just think about life without the byproducts. You'll be free to solve the interesting problems you're paid to solve, instead of spending half your day shoveling out piles of smelly programmatic byproducts. ■

Wayne Rash is a technology journalist and consultant.



WEB
WATCH

WAYNE
RASH

MODULAR VS. MODULAR

It sure seems that the attorneys working to harpoon Microsoft for antitrust violations are taking exception to Bill Gates' statement that Windows XP couldn't be broken up into modular pieces as desired by the nine states still pursuing the court case. Like many technical experts, the lawyers have pointed at Windows XP Embedded as a perfect example of a modular version of the Windows operating system.

While I'd certainly think twice before buying a used car from Bill, I can't agree with those who think that his description of Windows as a single cohesive system that can't be partially dismantled is a tall tale. As Microsoft witness Stuart Madnick pointed out during cross-examination at the trial, Windows XP Embedded is only *theoretically* a modular system, and there are significant differences in its implementation than what would have to happen in order to modularize the desktop version in any practical sense.

Theory is a big part of the trial. Microsoft's legal foes are essentially playing word games with their specific definitions of "middleware," "operating system" and "OS kernel." That may be fine till the end of the trial, but what's the reality if Microsoft winds up losing? A general market version of Windows XP Embedded? Not likely.

Windows XP Embedded is the direct descendant of Windows NT Embedded. This platform came about primarily as the result of an independent team of Microsoft developers doing a dependency analysis on Windows NT 4.0 to discover which components depended on which other components, and what kind of code and effort would be required to do away with those dependencies—if such were possible at all? While this dependency group did write some code modifications to Windows NT, there weren't many, and they were mainly concerned with making it "headless," taking away its keyboard, mouse and monitor.

All this work caused Windows NT Embedded to be released very late in the game—almost directly before Windows 2000 rushed onto the scene in 1999. Fortunately, Microsoft had learned some lessons from the Windows NT Embedded experience and became much more proactive about similar initiatives in Windows 2000 and Windows XP. The Windows XP team, for example, was responsible for its own dependency research and managed this process from the get-go rather than after the fact. This resulted in literally thousands of component dependencies being recorded for Win-

dows XP versus only a few hundred for Windows NT 4.0.

It also resulted in Windows XP Embedded being released just a couple of months after the desktop version came to market. So what's the real difference? On the surface, not much, even after Windows XP Embedded was morphed into Windows Embedded Studio, including some new tools and minor code modifications. Bottom line: It's basically the same as the desktop version.

This is where the "liar, liar, pants on fire" set points its trembling finger at Windows XP Embedded as a modular example of the Windows operating system. I'm betting none of them have ever tried to use Embedded Studio. If they had, they'd have noticed that some of the tools provided are intended to be used to test dependencies between code modules—no way did Redmond test every permutation possible before release. That's just too much work.

Another problem is that simply because Windows XP Embedded has identified a large number of dependencies, in no way should that imply that it's free of them. It merely provides a quick method to allow developers to identify and explore dependent relationships. But for many of them, Windows XP Embedded is just as interdependent as Windows XP desktop. In other words, the "modu-

lar" nature of the embedded version is actually more theoretical than practical.

Making that theory practical is why Microsoft released the Embedded Studio product, as a way for developers to test their own dependencies in conjunction with whatever specific task they were trying to accomplish. After all, that's typically the purpose of an embedded system: to be released as part of a hardware device aimed at a specific task rather than a general operating environment.

To expect general desktop VARs—or worse, users—to cobble together their own versions of Windows suddenly makes the supposedly friendliest operating system less user-friendly than the first distributions of Linux. Even if users managed to put together such a system, imagine the nightmare that would occur every time a new software application or even hardware peripheral were installed. Again, even if a quick dependency-checker could be developed, it still couldn't resolve problems—only identify them. Such a move could critically weaken Windows as a platform and paralyze Windows software developers.

And while weakening Windows might sound sweet to certain ears, weakening it without any kind of qualitative replacement is simply irresponsible. ■

Oliver Rist is a technology journalist and vice president of technology at AIC Inc.



WINDOWS
WATCH

OLIVER
RIST

IN WANG THEY TRUST

At its user conference in April, Computer Associates International Inc. made a number of significant announcements regarding its positioning in the software space, most notable another realignment of its product offerings, this time rolling its six new brands into five business units. At CA World, the emphasis was on the security solution eTrust, but in the world of CA, trust may be a shrinking commodity.

Then, in mid-May, the company released its fourth-quarter and fiscal-year 2002 earnings reports, claiming to have cut losses dramatically to reach the break-even point sooner than earlier estimates had forecast. The company reported that revenues increased to \$772 million and that cash from operations exceeded \$1.2 billion for fiscal-year 2002. For most corporations, this kind of news would be greeted with excitement on Wall Street.

But Computer Associates is not like most corporations—or, perhaps it is, only we just don't know it yet. Perhaps what happened at Enron Corp. and Andersen Consulting, destroyed by the heat of federal probes into alleged accounting misdoings and stock price manipulation, and CA's old auditor Ernst & Young and software vendor PeopleSoft, now under scrutiny for allegedly entering into a conflict-of-interest consulting agreement while Ernst & Young was PeopleSoft's auditor, points to a larger pattern of abuse by top corporate management, who seem to have forgotten they are there to make money for the shareholders, and not the other way around.

Computer Associates, despite attempts

to focus attention on its products and performance, continues to be dogged by allegations of accounting irregularities, Justice Department and Securities and Exchange Commission investigations, and shareholder lawsuits over earnings reporting techniques and questionable bonuses paid to top executives that relied on the company's stock price to be kept at an artificially high price.

INDUSTRY WATCH



DAVID RUBINSTEIN

The company has refuted each of these allegations, and is cooperating with the SEC probe. One Justice Department investigation, into the company's acquisition of Sterling Software Corp., has been concluded with no charges brought. However, many questions remain, and the spotlight remains harshly focused on the company that only last year had to fend off a takeover bid by Texas billionaire Sam Wyly, who claimed the company was poorly run and challenged board chairman Charles Wang for control.

A current shareholder lawsuit claims Computer Associates double-counted revenue when it changed the terms it used to describe revenue in 2000, when the auditing firm KPMG replaced Ernst & Young. The suit is similar to numerous other claims filed this year; the company has continued to deny any wrongdoing.

Meanwhile, the company last month acknowledged that a joint investigation by the SEC and Justice has been formalized with the issuing of subpoenas to unnamed "third parties"—Ernst & Young among them—as the agencies try to determine whether company executives manipulated 1998 revenue reports to keep the stock price high, allowing for

a planned \$1.1 billion compensation package for Wang, CEO Sanjay Kumar and executive vice president and company co-founder Russell Artzt.

In its way, Computer Associates has tried to deal with the negative publicity. It said it would respond to Wyly's allegations that the board was insensitive and acted as a rubber stamp to Wang, and it finally has: Last month, the board adopted a set of guiding principles for corporate governance and named former SEC accounting head Walter Schuetze to lead the board's audit committee. It named Lewis Ranieri, formerly of investment banker Salomon Brothers, as an independent corporate director, effectively to serve as a counterbalance for Wang. And after staunchly defending its accounting procedures as they pertain to licensing revenue, Kumar recently admitted these practices are under review.

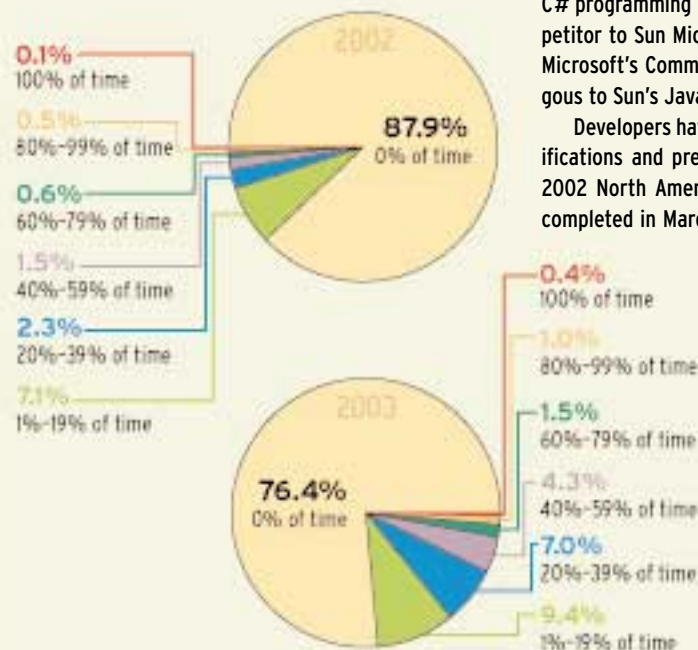
The guiding principles include guidelines on the size of and compensation to the company's directors and a policy that ties incentives to directors with the interests of shareholders. While not exactly an acknowledgment of any irregularities or worse, the fact that the board is adopting this rule seems to indicate the company is aware that the size of its bonus payments was unsettling, to say the least, to shareholders. Although shareholders backed Wang over Wyly last year, pressure is mounting from the SEC and Justice as well as through legal challenges, and Wang's performance is reminiscent of the string quartet on the Titanic.

For his tenure, and perhaps even survival of the company as it now is constructed, it's really a matter of trust, not eTrust. ■

David Rubinstein is executive editor of SD Times.

How Much Time Are Developers Currently/Anticipating Spending Programming in C#?

EVANS DATA WATCH



To many development managers, the concepts of Microsoft Corp.'s .NET and its new C# programming language may be inexorably linked. Widely perceived as a competitor to Sun Microsystems Inc.'s Java language, C# is designed to be run within Microsoft's Common Language Runtime, a managed execution environment analogous to Sun's Java Virtual Machine.

Developers have had access to the C# language for months, with language specifications and preliminary tools out since 2001. Yet in Evans Data Corp.'s Spring 2002 North American Developer Survey of more than 800 software developers, completed in March 2002—after Visual C# became commercially available—only one-tenth of 1 percent of respondents indicated that they are currently programming exclusively using the C# language. Indeed, only 12.1 percent said that they are using C# at all.

What about next year? Nearly twice as many respondents, 23.6 percent, indicate that they anticipate programming in C# next year. Considering that this represents almost one out of four developers surveyed, that's a large response for such a new language. However, only a very small number of developers plan to be using C# most of the time: Only 2.9 percent of respondents say they'll be using it at least 60 percent of the time in 2003. Still, that's up significantly over the 1.2 percent who are using it at least 60 percent of the time at present.

Source: Spring 2002 North American Developer Survey ©Evans Data Corp. www.evansdata.com

BUSINESS BRIEFS

Borland Software Corp. reported revenues for the first quarter ended March 31 of \$57.1 million, roughly a 10 percent increase over the \$51.7 million it reported for the same period a year earlier, but showed a decline in net earnings. According to CEO Dale Fuller, the company's top division is its Java business unit, which accounted for 38 percent of the company's first-quarter revenues in 2001. Lagging behind was Borland's deployment product group, specifically led by the VisiBroker ORB; Fuller said the weakness was due to the fact that OEMs and other customers "are keeping the lights on, but no one is deploying. Corporations are spending what they absolutely need to; the excess game is over. People are now asking explicit questions about return on investment." Net income for the first quarter of 2002 was \$4.6 million, or 6 cents per share, compared with \$5.9 million, or 8 cents per share, for the same quarter last year. . . . **Ascential Software Corp.** reported declining revenue for the first quarter of 2002 but also reported its losses are shrinking. Revenues for the quarter were \$20.1 million, down from \$25 million a year earlier, while pro forma loss was \$10.9 million, or 4 cents per share; under generally accepted accounting practices, the loss was 6 cents per share, as compared with a GAAP loss of \$31.2 million, or 12 cents per share, for the fourth quarter of 2001. . . . Real-time operating system vendor **Green Hills Software Inc.**, which is planning to go public sometime next year, announced revenues for 2001 of \$45 million, up 10 percent from 2000. "As soon as the economy returns to normalcy, we believe we can make an attractive offering," said John Carbone, VP of marketing. "We were set to go in 2000 when things started to skid." In a news release, privately held Green Hills showed its earnings on a per-share basis for comparison with **Wind River Systems Inc.** Green Hills claimed its earnings per share rose 42 percent in 2001 over 2000 and that Wind River's earnings declined 110 percent over the same period. Even so, a comparison of 2001 revenues showed that Wind River took in \$438 million, while Green Hills generated \$45 million. ■



CALENDAR OF EVENTS

- | | |
|--|-------------------|
| Embedded Systems Conference
Rosemont, Ill.
CMP MEDIA LLC
www.esconline.com/chicago | June 3-6 |
| XML Web Services One
San Jose, Calif.
101 COMMUNICATIONS LLC
www.xmlconference.com/sanjose | June 4-7 |
| VBITS/VSLive
New York
FAWCETTE TECHNICAL PUBLICATIONS
www.vslive.com/2002/ny | June 16-19 |
| Web Services/JDJ/XML Edge East
New York
SYS-CON EVENTS INC.
www.sys-con.com/webservicesedge2002east | June 24-27 |
| TechXNY/PC Expo
New York
CMP MEDIA LLC
www.techxny.com | June 25-27 |
- Information is subject to change. Send news about upcoming events to events@bzmedia.com.

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